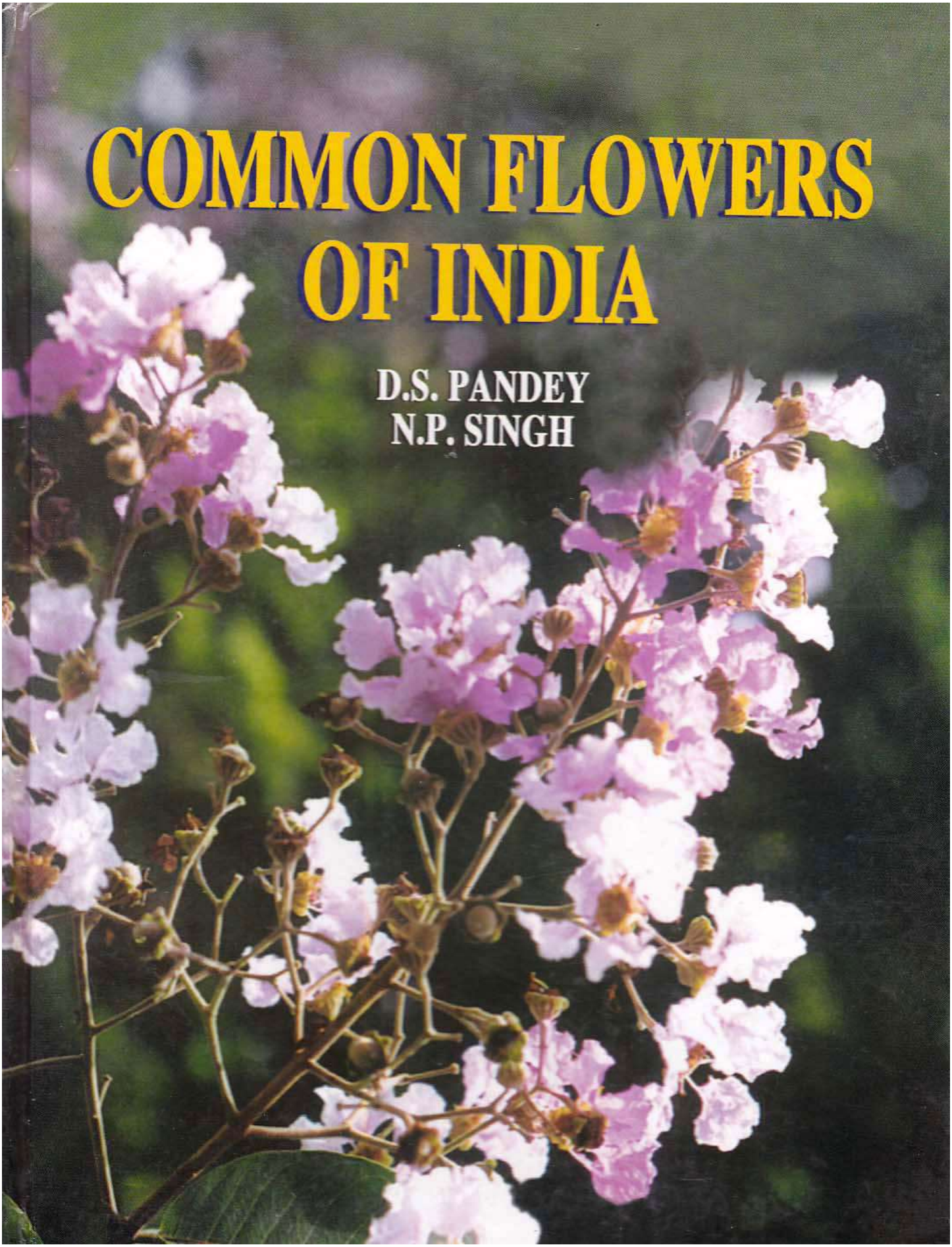
COMMON FLOWERS
OF INDIA
D.S. PANDEY
N.P. SINGH

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PREFACE

Our forests are very rich in plant wealth, many of which grow around human settlements. Among these a few are ornamental flowers with a diversity of form, size and colour. However, most people are unaware of their names, importance and growing practices.

The present book is written on a need-based request from the Director of Publications Division, Ministry of Information and Broadcasting, New Delhi assigning this responsibility to the scientists of Botanical Survey of India.

The work highlights 150 common plants, both indigenous to India and exotics, which are popular and grown for their flowers. These are dealt with under 51 titles giving their Indian and common names, scientific names, family, etymology, native home, habitat and a brief description of their interesting features, flowering and fruiting period, mode of propagation, their cultural aspects and brief economic uses besides ornamental importance. Photographs are given for their easy identification. List of scientific, common and Indian names and a glossary of technical terms used are appended at the end.

We hope the present book "Common Flowers of India" will serve the need of plant lovers, particularly children and teenagers who require a better understanding and knowledge of their surroundings. This will also be useful as a manual for their cultivation of flowers. Our present endeavour will be compensated if readers are benefitted by this attempt.

The authors wish to record their thanks to Sarvasree Subash Chandra Ghosh, Sr. Photographer; Amar Mondal, Photographer; Giridhari Lal Saha, Sr. Artist; Arup Kumar Banerjee, Botanist (Horticulture); Aloke Bhattacharjee, Curator; Saibal Basu, Botanical Assistant; Liyaquat Ali Laskar, Sr. Head Mali; Anjan Ghosh, Garden Attendant and other colleagues of Botanical Survey of India for their various help.

One of us (DSP) is grateful to Dr. L.K. Banerjee and Shri. H.J. Chowdhery, Joint Directors of Botanical Survey of India for rendering facilities.

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We are grateful to the authorities of Agri-Horticultural Society, Alipore and Victoria Memorial Garden and a few local nurseries and amateurs of Kolkata/Howrah for their kind permission to photograph some plants.

Finally the authors record their gratefulness to the Director, Joint Director and all other officers and staff members of Publications Division of the Ministry of Information and Broadcasting, New Delhi for publication of this book.

Botanical Survey of India
Kolkata

Daya Shankar Pandey
&
Netra Pal Singh

INTRODUCTION

Consequent upon the Earth Summit in 1992 at Rio de Janerio, Brazil, the Convention on Biological Diversity (CBD) was passed and ratified by most of the countries of the World. This envisages inventorization, conservation and sustainable utilization of biological resources. Thus it has become obligatory to study and acquire knowledge on all aspects of biodiversity and to make people aware of the need for its proper conservation and sustainable use. Books and particularly the popular ones are the best sources of education to all strata of society, including children. Thus the present book will go a long way in popularizing the ornamental plant wealth around us.

India is one of the 12 megadiversity centres of the world harbouring two hotspots in Western Ghats and North East, besides the unique vegetation and flora of Andaman and Nicobar Islands. It is estimated that India is the land of over 48,000 plant species and about 17,500 species Angiosperms (Flowering Plants). To conserve the rich biodiversity of India official measures include-in-situ was set up 12 Biosphere Reserves, 85 National Parks, 479 Wildlife Sanctuaries besides Wetlands and Heritage Sites, etc. Conservation is also being done in various gardens of India, particularly those of the Botanical Survey of India (BSI). It is estimated that 1182 threatened plants occur in India, which are detailed in the Red Data Book of Indian Plants.

Flower is a showy structure of a plant consisting of four whorls; calyx-outer whorl (each segment is called sepal); corolla-inner whorl (each segment is called petal), androecium-male reproductive part (each one is called a stamen); and gynoecium-female reproductive part. These have many shapes, sizes and colours which attract not only human beings but also insects, which in turn help in pollination and seed production.

Flowers are an integral part of the humanity. Its importance was well understood by our ancestors, who had great love for nature. They are described in ancient Sanskrit literature.

Trees of Banyan, Bel, Champaka, Kadam, Jaba, Mango, Goose berry, Aparajita, Datura, Madar, Indian Lotus, Sacred Barna, Silk cotton tree and others are planted around village vicinity, near temples, mosques, tombs and burial grounds for shade, flowers and fruits, for worship and offerings to gods and deities. Many plants and flowers are associated with a particular god and religion, viz. Flowers of Flame of the Forest-sacred to Buddha; Silk Cotton tree-sacred to Shiva; The flowers of white Bauhinia (Kachnar)-sacred to Lakshmi; Blue lotus-symbol of Vishnu; Indian Laburnum-trade and prosperity; Datura-Shiva; Aparajita-Goddess 'Kali'; Indian Lotus-associated with Hindu Gods and Goddesses, 'Brahma', 'Vishnu', 'Lakshmi' and 'Kali'; Garden Hibiscus-Goddess 'Kali'; The Ashoka tree is dedicated to 'Kama', the God of love and Madar-Shiva.

Flowers also play an important role in imparting recreation, aesthetic sense, in spiritual and social ceremonies; and of economic value as well. One can earn money by selling flowers and plants used for making garlands, bracelets, button-hole, bouquet, cut flowers for decorations, wreaths, etc. Flowers also yield essential oil and are sources of medicines.

Love of flowers has been universal. According to the Chinese proverb "Habit and Customs differ but all the people have the love of flowers in common".

Flowers have even been honoured as National or State flower due to their high floral quality and for their common occurrence in that particular area, like the National Flower of India is the Sacred Lotus.

India enjoys all types of soil and climate and is very rich in plant wealth including numerous plants of ornamental interest. Many are found wild and a few of them have been brought under cultivation in gardens, grown around village vicinity, near temples, town planning, afforestation, etc. Many are localised and restricted due to their phytogeographical and extreme climatic conditions. The common trees and flowers need better popularity; our common people, children and teenagers are sometimes unaware of several plants, which not only possess good, attractive and charming flowers but are even of high utility. The knowledge about their names, family to which they belong, type and time of flowering, cultivation aspects, etc. will render a better understanding and will create environmental awareness. The present book highlights some of these less known aspects.

About 150 species and varieties under 51 Chapters are included in this book, which covers 48 genera and 31 families. The chapters include trees (14), Shrubs (17), Climbers (4), Annuals (9), Bulbous plants (5) and Water plants (2 species) besides other interesting common flowers of the group. Among these 44 are Indian and remaining are of foreign origin, which have occupied their place in this country as ornamentals and for their other values such as ·

i) **Religious plants and flowers:**
Ashoka, Aparajita, The Purple Bauhinia, Champak, Cape Jasmine, Common Jasmine, Datura, Nag-Keshar, Indian Lotus, Indian Coral tree; Indian Laburnum, Garden Hibiscus, Sacred Barna, Temple or Pagoda tree, Yellow Silk Cotton tree, Yellow Oleander, etc.

ii) **Medicinal:**
Allamanda or Golden Trumpet, Aparajita, Ashoka, Common Jasmine, Indian Lotus, Opium Poppy, Madagascar Periwinkle, Parijat, Variegated Bauhinia, Sacred Barna, Water Lilies, etc.

iii) **Essential oil:**
Arabian jasmine, Champak, Common Jasmine, Hara Champa, Parijat, etc.

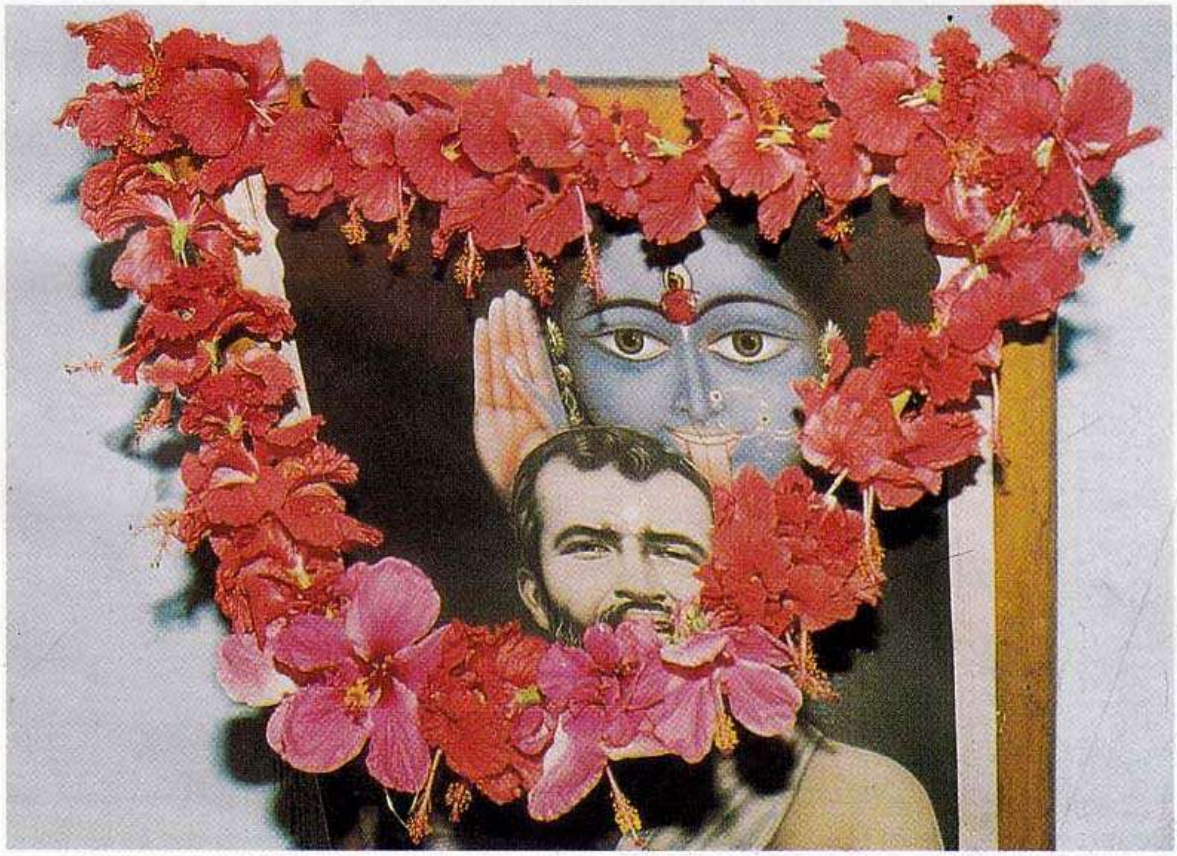
iv) **Economic plants:**
Fibre-Yellow Silk Cotton tree, Indian Coral tree; *Gum*-Yellow Silk Cotton tree, *Tannin*-Champaka; Rose-water-Edward and Damusc rose, Tuberose; *Lac*-Flame of the Forest; *Oil*-Sunflower; *Dye*-Garden Hibiscus, Aparajita, Parijat; *Garland*-China Aster, Chrysanthemum, Marigold, Tuberose; *Vase-decoration*-China Aster, Dahlia, Antirrhinum, Gladioli, Tuberose, etc.

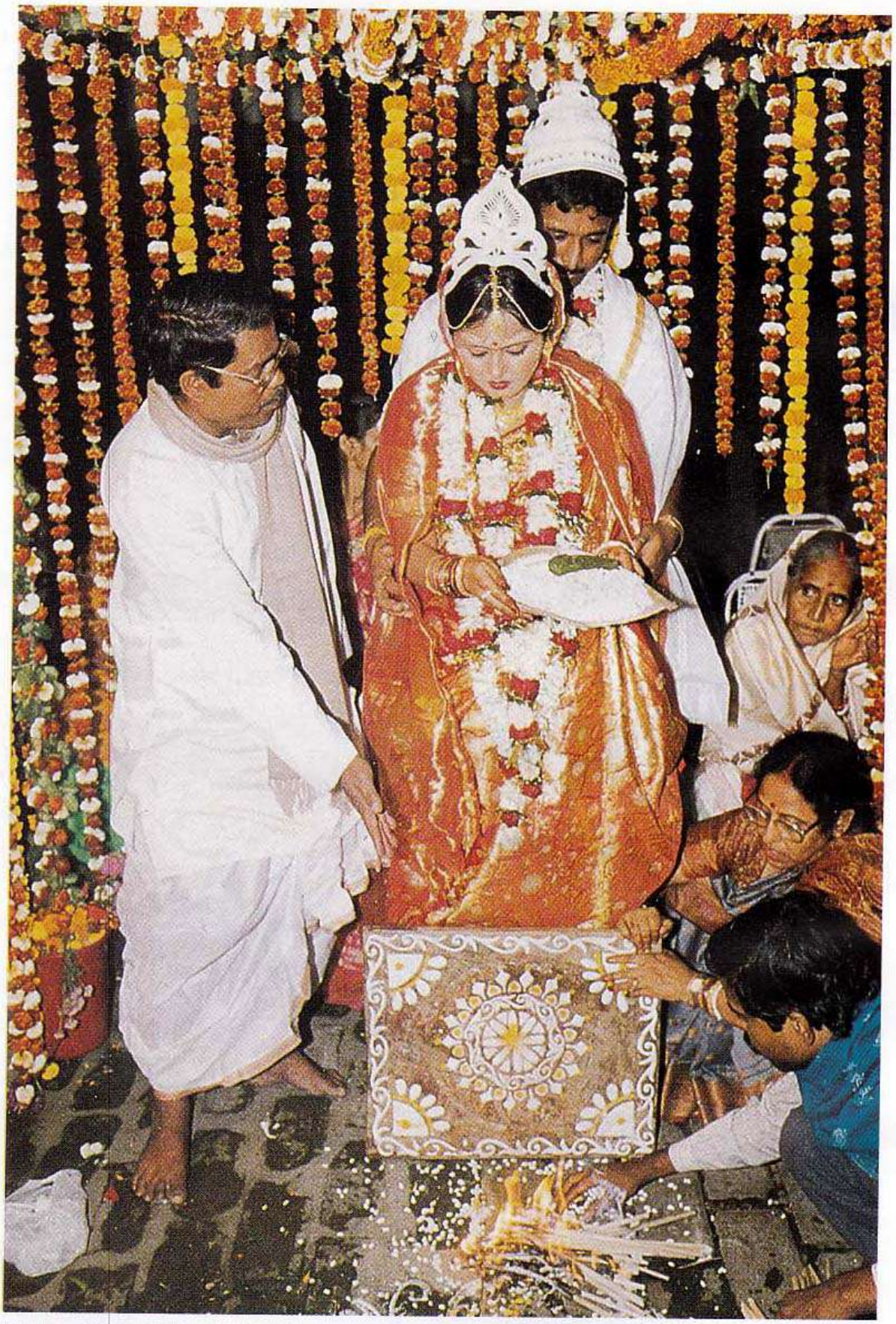
v) **Avenue, township planning:**
Peacock Flower, Indian Laburnum, Giant Crape Myrtle, Bottle Brush, Indian Coral tree, Jarul, Rusty Shield Bearer, Umbrella tree, etc.

vi) **Shrubberies:**
Batleria, Crossandra, Garden Hibiscus, Cape Jasmine, Common Crape Myrtle, Common Oleander, Yellow Oleander, etc.

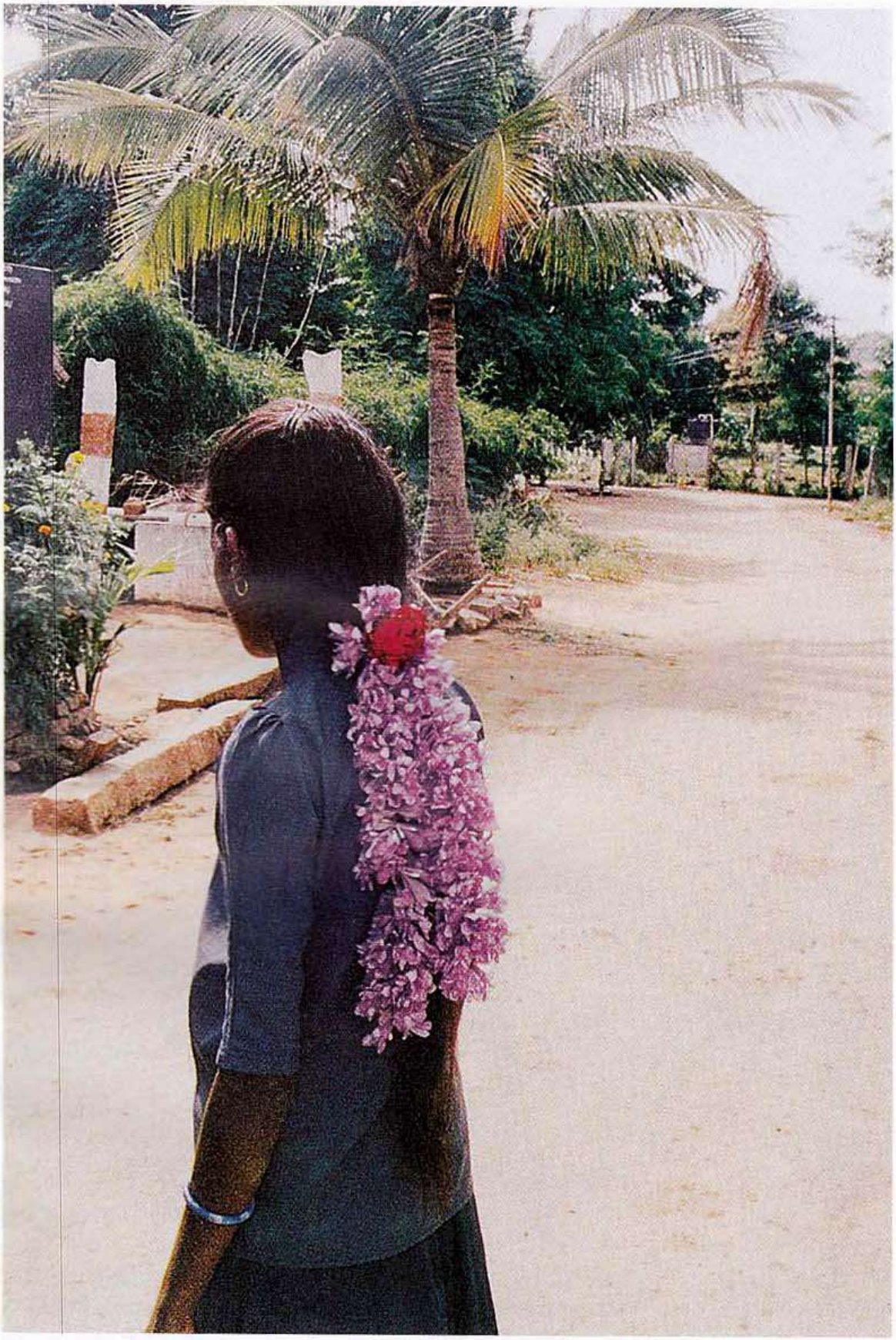
Various cut flowers in a bouquet

Flowers in religious offerings

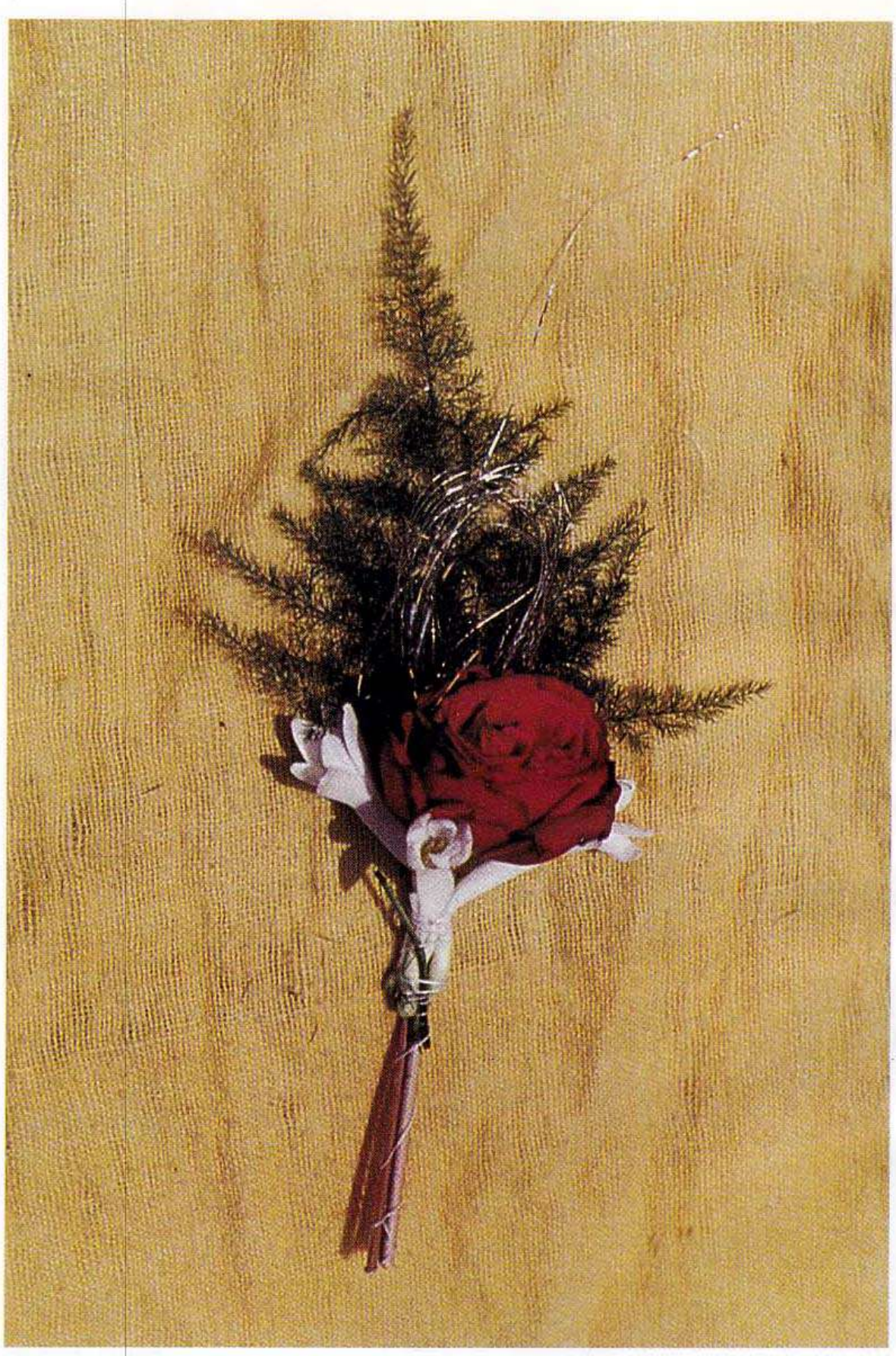




Flowers as integral part of social ceremonies



Flowers as hair adornment



Flowers adorning a buttonhole

vii) Terrace garden and marshy place: Crinum.
viii) Water Plants: Indian Lotus, Water lily.

Among others, a few are worth mentioning. They are found in different regions of India either in wild state or cultivation for their flowers as well as for other economic importance like:

Argyreia cuneata, A. hirsuta – Nilgiri hills, Snake hood plant *(Arisaema leschenaultii)* – South Indian hills; *A. tortuosum* – Himalayan region, *Camelias*; Heralds – Trumpet *(Beaumontia grandiflora)*; *Clerodendrum phlomoides, C. serratum; C. squamatum* – Himalayan region, Elephant Apple *(Dillenia indica)*; *Crinum latifolium*; Crocus sp.; *Glinoidia sepium*; Malabar Glory lily *(Gloriosa superba)*; Common Ginger lily or Butter-fly-lily *(Hedychium coronarium)*; *H. coccineum*–North–Eastern region; Yellow ginger lily *(H. flavum)*; *H. gardnerianum; H. rubrum* – North – Eastern Himalayan region; Madhabilata *(Hiptage benghalensis)*; Easter Tree *(Holarrhena pubescens)*; Common Wax Plant *(Hoya carnosa and parasitiaca)* – Himalayan region; *Ipomoea nil; Iris* spp. – Western Himalayas; Madona Lily *(Lilium candidum)*; *L. giganteum* – Himalayan region; *L. wallichianum* – Shevaroys and Nilgiri hills of South India; *Magnolia campbellii, M. hodgsonii* – Eastern Himalayas; *M. pterocarpa* – Eastern Himalayas; Jewel-of-String *(Milletia peguensis)*; Indian Cork Tree *(Millingtonia hortensis)*; Iron wood Tree *(Memecylon umbellatum)*; Orange Jessamine *(Murraya paniculata); Ochna jabotapita; Mussaenda hirsutissima* – South Indian hills; Malay Paduk *(Pterocarpus indicus)*; Mukkchunda, Maple tree *(Pterospermum acerifolium); Rhododendron anthopogon* – Western Himalayas; Tree Rhododendron *(R. arboreum)*, Giant Blood Rhododendron *(R. barbatum)*; *R. campanulatum; R. formosum R. hodgsonil* – Himalayan region; *Wrightia coccinea; W. tomentosa*, etc.

Several species of orchids having peculiarities in their floral forms are of importance as ornamental flowers which can be kept for longer periods and as cut flower for indoor decoration. India possesses approximately 1300 species belonging to 184 genera and these mostly occur in North-western Himalayas (*ca* 200); North Eastern Himalayas (*ca* 600), Western Ghats (*ca* 300), Peninsular India (*ca* 200) and Andaman & Nicobar Islands (about 82 species), among these important species are common Fox Tail Orchid, *(Areides multiflora)*; Fragrant Fox tail Orchid, *(A. odorata)*; Fire Bush Orchid, *(A. rosea)*; several types of *Cattleyas*; Lady's Slipper *(Cyprepidium candidum, C. parviflorum, C. reginae)*; Cristate Coelogyne *(Coelogyne cristata)*; Ivory flowered Cymbidium *(Cymbidium eburneum)*; Tiger Striped Cymbidium *(C. tigrinum)*; Lady's White Cymbidium *(C. whiteae)*; Fischer-Leafless Dendrobium *(Dendrobium aphyllum)*; *D. chrysanthum; D. crepidatum*; Pine Apple Orchid *(D. densiflorum)*; Formosum dendrobium *(D. formosum)*; Noble Dendrobium *(D. nobile)*; Primrose Orchid *(D. primulinum)*; Wardl Dendrobium *(D. wardianum)*; *Laelia albida; L. crispa; L. flava; L. purpurata; Paphiopedilum*, viz. Thousand's Pound orchid *(P. venustum)*; Flowering Stick Orchid *(Papilionanthe teres)*; Sulphur–Flowered Nun's orchid *(Phaius flavus)*; Nun's orchid *(P. tankervilliae)*; Rattle Snake orchid *(Pholidota imbricate)*; Moth orchid *(Phalaenopsis amabile); P. parishi; P. speciosa; P. violacea*; Hooker's Windowsill Orchid *(Pleione hookeriana)*; Dwarf Windowsill Orchid *(P. humilis)*; Himalayan Windowsill orchid *(P. praecox)*; *Spathoglottis affinis; S. aurea; S. plicata; S. grandifolia;* Marshall's Orange Thunia *(Thunia marshalliana); Vanda bensonil*; Indian Blue Vanda *(V. coerulea); V. caerulescens; V. cristata; V. hookeriana;* Indian Brown Vanda *(V. stangeana)*; *V. teres*; Himalayan White Vanda *(V. undulata)*, etc. and their numerous hybrids have been evolved which have got tremendous horticultural value as a commercial crop.

A few important species having showy flowers seen in India are not of Indian origin but have been introduced from outside (Exotics) by plant lovers, specially by Mughal emperors, Missionary Botanists, European officials and plant explorers. These ornamentals have also boosted our economy and added horticultural values. Important among these are: Allamanda, Alkanet, Floss–Flower, Coral–Creeper, Queen of the flowering tree, Common Snap Dragon, African Daisy, Fringe Flowered Aristolochia, The Birds Head Birthwort, The Hairy Birthwort, Orchid Tree, Black-Berry lily, Daisy flower, Trumpet Flower, Bougainvillea, Browallia, Brownea, Brunfelsia, Pot Marigold, Sweet Sultan, Wall Flower, Pride of Barbados, Pink Powder Puff, Bottle Brush, Aster, Yellow Oleander, Periwinkle, The Java Cassia, Prickly Apple, The Day Jasmine, Lady-of-the Night, Chrysanthemum, Glory Pea, Scarlet Cordia, Cannon Ball Tree, Rubber Vine, Peacock Flower, Wedding Flower, White lace Euphorbia, Cape Jasmine, Spotted Glivicidia, Stinkwood, Changeable Rose, Shoe flower, Rose-of-Sharon, Common Morning Glory, May Flower, Pink Kopsia, Cat's Claw, Great Laurel Magnolia, Sleeping Mallow, Nemesia, Flowering Tobacco, Love-in-a-Mist, Passion Flower, Giant Granadilla, Pentas, Purple Wreath, Petunia, Pagoda tree, Frangipani, Portlandia, Rose Moss, Golden Shower, Phlox, Tuberose, Lemonia, Mignonette, Rondelatia, Scarlet Salvia. Butter Fly Flower, Florist's cineraria, Potato, Potato Creeper, Tulip Tree, Tabebuia, African Marigold, French Marigold, Yellow Elder, Bush-clock-vine, Tithonia, Star Jasmine, Nasturtium, Verbain, Monarch-of-the Veld, Pansy, Blue-Acacia, etc.

The role of Indian Botanic Garden (formerly Royal Botanic Garden) established in 1787, is premier, through which many species were introduced, got acclimatized and distributed to different parts of India.

Some common flowers among exotics are: Allamanda, Golden Trumpet Bush, Purple Allamanda, Common Snap Dragon, Pot Marigold, Yellow Oleander, Madagascar Periwinkle, The Java Cassia, Burmese Pink Cassia, Hollyhock, Cockspur Coral Tree, Blakei Erythrina, Chinese Ixora, Singapore Ixora, Bell Bauhinia, Chrysanthemum, Cape jasmine, Changeable Rose, Garden Hibiscus, Rose-of-Sharon, Common Morning Glory, Plumeria or Frangipani, Tuberose, African Marigold, French Marigold, Bush-Clock-Vine, China Rose, Sunflower, Bottle Brush, Common Oleander, Rusty Shield Bearer, Garden Dahlia, Gladioli, Radha Chura, etc. However, some common flowers like Antirrhinum, China Aster, Chrysanthemum, Crossandra, Dahlia, Gladioli, Jasmines, Indian Lotus, Marigold, Rose and Tuberose are commercially cultivated. Besides some less known plants like Carnation, Amaryllis, Hippeastrum, Gerbera, Anthurium, Hemerocallis, Bird-of-Paradise, Stocks, Narcissus, Orchids, etc. are also commercially important.

In the following text details of each species include its common name, vernacular names, local names, botanical names, family, distribution, brief description of their morphological characters, flowering-fruiting period, propagation, cultivation, utility and its ornamental importance. Photographs of plants are included for easy identification. Meaning of botanical and technical terms, and sketch of morphology of various plants parts are given after introduction. A list of books and periodicals consulted is furnished after the text.

BULBOUS PLANTS

Canna

Canna is one of the popular, perennial plants, having handsome broad, smooth banana-like leaves (green or bronzy green or variegated with yellow stripes) and with bunch of odd-shaped and unsymmetrical bright brilliant flowers in many forms and colours, much prized and rendering mass effect.

It occurs in marshy places, along ponds, lakes and water streams and also commonly cultivated in parks and gardens under semi-shaded situations. Its flowers are composed of 3 green or bronze sepals and with 3 petals similar to sepals, green or coloured, and the coloured portions of the flower is called staminodia or stamens represented by staminodia, which is the showy part of the flower.

Out of about 50 species of *Canna*, mostly distributed in tropical and subtropical countries, *Canna indica* L., commonly called Indian-shot (representing hard, round and black seeds similar to shots), is indigenous and found throughout India with small yellow or scarlet flowers, belongs to monocotyledons family-Cannaceae.

Canna in Latin means reed or cane; is known as Devakili, Krishna Tamara Sarvajdya in Sanskrit, Keli, Vaijanti (Hindi), Sarbajaya Kala-phul (Bengali), Devakeli (Marathi), Hudingana (Kannada), Kalvalai, Puvalai (Tamil), Krishnatamara (Telugu), and Katuvala in Malayalam.

Perennial herbs, with rhizomatous roots, up to 1.5 m tall; stems cylindrical, fleshy, glabrous; leaves oblong, narrower at upper end and acute; flowers terminal in pairs, small; floral-bracts orbicular, flower narrow and erect; petals about 4 cm long, upper staminodia 3, bright red, about 5 cm long.

The present day florist's Canna are evolved through hybridization between *Canna indica* L., *C. flaccida* Salisb., *C. iridiflora* Ruiz. & Pav., *C. glauca* L. and *C. warsceiwiczii* Dietr., and hybrids have larger flowers varying in size and in colour.

Generally the plant flowers throughout the year, but profuse flowering is during January-April and is commonly propagated by division of rhizomes during July and by seeds soaked in hot water or kept in cow dung manure for 3-4 days to loosen its hard covering and followed with slight slit with knife and put in soil for easy germination.

It grows well in rich soil, requires full sunshine and enough moisture. It can be even grown in light or poor soil by providing cow-dung manure; however for heavy soil, sand and leaf mould are added for good growth and flowering.

Bit of rhizomes having 1 or 2 lateral buds in each are placed at a distance of about 45-60 cm in 2.5-3 cm depth, covered with soil and watered gently. Though it needs less care, however, regular watering and feeding with well rotten compost or liquid

manure promotes good growth and luxuriant bloom. A mixture of Potassium sulphate and Ammonium phosphate in 2:5 ratio at the rate of about 2 oz per sq m, 3 times in a year is applied and watered for good result. Generally first pseudo-stem emerging from the rhizome is cut down to allow for developing better root system, thus the second sprouts bear good size and quality bloom. After cessation of flowering, rhizomes are dug out, before rains and dumped in cool shady place for a few days to give rest and re-planted again in well prepared beds which give good growth and flowers in the successive year.

Cannas do well in pots also, 45 cm size earthen pots are filled with a mixture of red earth or garden soil, leafmould, manure, loam, charcoal in 2:2:2:1:¼ ratio, respectively and planted with 1 or 2 pieces of rhizome bits in the beginning of June. Proper watering and good drainage is essential.

Cannas are affected by caterpillar and grass-hoppers, which are controlled by spraying stomach poison. Grubs are handpicked and destroyed. Fungal attacks are controlled by spraying of Potassium permanganate.

Cannas are classified according to flower type and foliage. Among flower type 1) Miniature flower, 2) Orchid or Italian, 3) Gladiolus or French type; according to foliage: 1) Green foliage, 2) Bronze colour and as per height grouped as: 1) Tall types (120-180 cm): varieties include Radio (white), Apricot King, Alipore Beauty, King Humbolt (orange), Percy Lancaster (yellow), Assant-dark and President (scarlet). 2) Dwarf types (60-120 cm): Beauty (pink), Star dust (cream), Swarn Hans, Bharat (red), Cleoptora (orange), Apricot (yellow) have variegated leaves, whereas Alzae, Black Knight, Princess, Statue of Liberty and Empress of India have bronze foliage.

Though *Canna* flowers do not stand as cut flowers for long, they are suitable to plant along boundary wall, as ornamental hedges and also suited as pot plants to decorate balconies and verandah.

Besides its ornamental beauty, its stem yields fibre which is used for preparation of rope-twine and sack-cloth.

Crinum

Crinum, derived from a Greek word 'Krinon' meaning a lily and in Latin 'crinon' meaning a red lily, belongs to Lily family—Amaryllidaceae, is characterised by its hardy, perennial bulbous rootstocks having fleshy, elongate, terete or ensiform leaves; flowers-large, showy, appear on long solid scapes in umbels below the spathaceous bracts, funnel or salver-shaped flowers, white or in shades of red and purple with long tube, straight or upward, lobes-6 linear to oblong, stamens-6, attached on the throat of the flowers, filaments-free, filiform, erect, anthers-linear, dorsifixed and versatile. Ovary-a few or many in each cell, style-filiform; stigma-minute. Fruits-large, subglobose with a few seeds having large thick, copious albumen. A few species emit delightful fragrance; suitable to grow along streams in marshy places and also in pots.

About 200 species are distributed in Tropical Asia, Tropical Africa, Australia and Pacific Islands out of which 13 species occur in India, among these Antidote Lily and

Asiatic Poison Bulb (*Crinum asiaticum* L.) is most commonly grown in gardens and well suited for terrace gardens, lawns, along ponds and in front of walls for its star-shaped showy and fragrant flowers. The father of Indian Botany (Dr. William Roxburgh) had rightly admired its immense large beautiful, smooth dark green leaves which make it conspicuous and desirable in the flower garden. It is locally called Nagdamini, Nagapatra or Vishamandal (Sanskrit), Kanwal, pindar (Hindi), Nagdaun (Bengali), Arsa (Oriya), Nagdamini (Gujarati), Nagdevana (Marathi), Chengaluva, Kessarchettu, Cheepachettu, Vishamungil (Telugu), Vishamungali, Kaduiralli (Kannada), Vishamugil (Tamil) and Nagin-ka-patta in Deccan.

Bulbs large, 10-12 cm thick with long neck 15-23 cm; leaves sword-like, yellowish-green, *ca* 90-120 cm long and 8-12 cm broad; flowers white, narrow, purplish-red inside, appear in an umbrella of *ca* 50 or even more; filaments tinged red; fruits round and smooth.

Flowers throughout the year but profuse during September-December and February-May. Easily propagated through seeds and by division of bulbs arising from near the main plant and are separated and planted during rainy season.

Besides its ornamental importance, bulbs and roots are given as a substitute of Ipecac for curing cough, cold and urinary troubles.

Ditch Crinum or Spider lily (*Crinum viviparum* (Lam.) Ansari & V.J. Nair or (*C. defixum* Ker-Gawl), known as Vishamondala (Sanskrit), Sundarshan, Jalkanda, Sukhdarshan (Hindi), Sukhdarshan (Bengali), Kumbaya, Madhukanda (Marathi), Kondai (Oriya), Gavarikond, Nagrikond (Gujarati), Kesari chettu (Telugu) and Thudavachi, Vishamungil (Tamil), Gajina gida, Gujara, Kadu Erulli, Visha biduru (Kannada), Kumbaga, Piyukond (Marathi) Velluttapolatali in Malayalam.

Common along water streams throughout tropical regions and planted near ponds and wet places.

It is characterised by linear and deeply channelled, subfleshy, dark green leaves (60-90 × 2.0-4.5 cm), slightly concave, apex acute. Flowers: scape 50-80 cm long and cylindrical; 7-12 in umbel, white. Fruit a capsule, stalk short and beaked.

Flowers May – June.

Bulbs are used for treatment of burns, swellings and are poisonous to cattle.

Out of about 30 species of *Crinum*, other than from India native, Giant Spider Lily (*Crinum amabile* Donn) is an exotic introduced from Sumatran origin, have large bulbs and neck up to 30 cm long. Leaves robust, sword-like, 25-30 in number, *ca* 10 cm wide and 1 m long. Flowers appear on long and robust stalk having bright red tube and red down centre of the white segments and heavily fragrant; stamens slender and prominent but shorter than the curved segments. It does not set fruits. The plant flowers during September-December.

It is planted in gardens for very showy flowers which emit strong fragrance, suitable to grow alongside of walls and propagated by separating small offshoots from near the mother plants; requires replanting after 3-4 years.

Crinums require little care. Rich and porous soil is needed and after planting pot should be placed in shade to protect it from scorching sun; if planted in pits, open at a depth of 50-100 cm and fill it with well rotten cowdung manure or compost. Plants to be planted during March-April or July-September. Flower scapes after fading and drying. Needs cut back from the ground level.

Dahlia

Dahlia is very popular among ornamental annuals, much planted in gardens and also commercially cultivated chiefly for cut flowers, excellent for general decoration and suited for indoor display, found in different forms, single or double with shades of red, white, yellow, purple, mauve, etc. which present picturesque effect when in full bloom.

Dahlia is named in honour of Dr. Andreas Dahlius (1751-1789), a famous botanist and pupil of Linnaeus.

Tuberous rooted, stout, perennial herb, with woody base; erect, branching. Leaves opposite, glabrous, 1-3 pinnate. Flower heads appear on long peduncles; ray-florets neutral or pistillate spreading, entire or minutely 3-5 dentate; disc florets, yellow perfect and fertile; fruit an achene, 2 toothed or entirely bald.

Dahlias are indigenous to Mexico, first introduced in London in 1789 and in India in 1872.

Out of about 20 species, *Dahlia coccinea* Cav., *D. pinnata* Cav., *D. rosea* Cav. and *D. variabilis* Desf. are generally cultivated, and belong to Aster Family–Asteraceae.

The present day Dahlias are mostly hybrids and are available in different types, grouped as: 1. Single-flowered, 2. Anemone-flowered, 3. Collerette, 4. Peony-flowered, 5. Decorative-further divided as Giant, Large, Medium, Small and Miniature decoratives, 6. Ball, 7. Pompon, 8. Cactus-divided as Giant, Large, Medium, Small and Miniature cactus, 9. Semi cactus-Giant, Large, Medium, Small and Miniature semi-cactus, 10. Miscellaneous, Fimbriated-Giant, Large, Medium, Small fimbriated, 11. Water lily and 12. Star flowered and a large number of varieties are available for florist's need.

It requires open, sunny situations, avoiding shades of large trees or walls, grows in any soil but prefers light, well drained and moderate rich soil.

These are propagated through seeds, cuttings by division of roots and grafting.

Planting distance mostly depends on type of plants and varieties; for medium varieties 60-90 cm; small flowering about 75 cm and Pompon about 60 cm apart. Manuring is done before planting at the rate of 40 kg N, 50 kg Phosphorus and 40 kg Potash, per acre.

A fertilizer mixture of superphosphate, muriate of Potash and urea in 3:2:1 ratio, one teaspoonful per pot (20 cm) is given at the time of bud formation, Pure bone meal and nitrate of soda (4:1) and Potash is dusted to get good size of flowers and tubers. A solution made of 1/4 chicken or goat manure in 3/4th water, applied at the base of plant, promotes large flowers, followed with regular watering. Proper supports are given to larger sized varieties, plants need shade to prevent flowers from discoloration. Partly opened flowers are collected for cut flowers. Tubers are removed and stored in sand for further propagation in the next season.

Plants are generally affected by aphids, which transmit virus disease such as mosaic, are checked by dusting or spraying of tobacco mixed with water or sprayed with 2 per cent metacid, or basudin; leafhopper renders discoloration of leaves which can be controlled by spray with 3% malathion or metacid; Thrips are checked by spraying 1% malathion or metacid, and Red spiders, which damage foliar parts and form web on leaves and buds, can be checked by spraying of metasystox or karathane, and slugs and beetles are checked by hand picking and cut-worm by dusting lime powder. Plants affected with

Powdery mildew are sprayed with copper sulphate or 0.1% bavastin or karathane; Botrytis blight occurs during dull cloudy weather, young flower buds get infected with grey mould and petals fade-spray with Zineb, captan or ferbam; stem rot occurs due to nonporosity of soil, for which soil should be sterilized with steam or chemical; smut is controlled by spraying 5% Turben; Crown gall or root knots-large tumour like growth develops at the base of the plant and roots, thus plants become stunted, for this propagules are dipped into streptomycin before planting and plants affected with mosaic (leaves becoming mottled and change to pale green) are uprooted and eliminated.

Gladioli

Gladioli are much popular for beautiful funnel-shaped flowers which are found in many forms and wide range of attractive colours (white, yellow, cream, pink, orange, scarlet, red, mauve, violet and in shades of different hues), on long spikes, continue to open in succession from below upwards, remain fresh for longer periods; well-suited for cut flowers; used as vase decorations, bouquets for wedding and social offerings.

It is botanically called *Gladiolus* which is derived from a Latin word 'gladius', meaning sword, representing leaves and hence common name Sword-Flag, belongs to Iris family-Iridaceae.

Herbs, perennial, stems swollen in form of corm, flat, surrounded by linear sword-shaped leaves with prominently parallel venation. Flowers on terminal spikes, tubular, usually funnel-shaped, colourful, in a single spathe, similar to leaf; stamens 3; style long; ovary 3-loculed; fruit a capsule; seeds flattened and winged, sometimes globose.

Nearly 160 species of *Gladiolus* occur, mostly in South Africa and middle west Asian region, but due to much hybridization and selection, it has become impractical to distinguish original species, and hybrids are mostly evolved from *Gladiolus gandavensis* Van Houtt, *G. lemoineii* Hort., *G. childsii* Hort., G. alatus L., *G. grandis* Thunb., *G. watsonius* Thunb., *G. tristi* L., *G. biflorus* Klott, *G. vittatum* Hornem, *G. primulinus* Baker, *G. purpurea – auratum* Hook. *G. psittacinum* Hook., etc.

Gladioli flowers from February-April in plains and September-December on hills.

It is propagated through seeds, but generally planted with cormlets. Plants grow best in sunny situations and do well in sandy loam soils; for hard soil, well rotten humus or leafmould and sand are mixed; it can be planted in beds as well as in pots. Cormlets are planted during September-November in the plains and in the hills from March-June in well prepared and manured beds, preferably with well decayed compost of 4 kg per metre. Corms are planted in rows, keeping 20-30 cm distance, 5-10 cm plant to plant and at a deepth of 8-10 cm and covered with about 3 cm layer of sand. Watering, interculture and liquid manure are applied to enhance growth and size of bloom. For pot culture, a mixture of sandy loam soil, well-rotten cow-dung manure and leafmould in 2: 1: 1 ratio, mixed with a little quantity of bonemeal filled therein and planted with 3-5 cormlets. After flowering is over, stems having yellow colour are cut down from about 30 cm from the ground and left for maturity of corms, and are removed from the ground, cormlets are separated and placed in sand in dry cool and shady place, and re-planted in the coming season only, after appearance of new shoots.

Generally free from insect attack and diseases, but when rotting of corms is seen the rotten corms should be separated and discarded.

Among numerous hybrids some notable ones are: *White and cream shades* – Europe, Maria Goretts, Snow Prince, White Friendship, White Sensation.

Yellow shades: Flower Song, Yellow Golden King, Silver king, Green Woodpecker, Nigra, Phebus, Spot-light.

Orange shades: Hochsommer, Peter, Pears, Queen of Holland.

Salmon, Pink and rose shades: Alfred Nobel, America, Happy End, Hope and Glory, Roman Holiday, Bon Voyage, Dr. Fleming, Mrs. Frank, Pink Sensation, Wild Rare.

Red shades: Aristocrate, Life Flame, Oscar, Princeps, Socrates, Trader Horn.

Blue and Purple shades: Blue Pearl, Fidelio, Memorial Day, Pandian, Marbel Violet.

Maroon: Empress of India, Mrs. Milins; and among Miniature are: Bo Peep, Dancing Doll, Greenwich, Royal Touch, Tropical Sunset, West End, Zenith, etc.

Tuberose

Tuberose is one of the most popular and common flowers, much liked and has its special merit and admiration, particularly among bulbous plants because of its waxy-white flowers diffusing exquisite and powerful fragrance which attract from quite a long distance. Its cut flowers are in heavy demand for preparing artistic garlands, bouquets, buttonholes, for vase decoration, adornment of hairs of ladies, as the flowers remain fresh for a long time.

It is called Rajanigandha (Sanskrit and Bengali), Gulcheri, Gul-shabba (Hindi), Sukandaraji, Nelasampengi (Telugu), Nila sampengi (Tamil), Sugandharaja and Sundharaga in Kannada; botanically named *Polianthes tuberosa* L., belongs to Amaryllis family – Amaryllidaceae.

Polianthes, comes from Greek word 'Polies' & 'anthos' meaning white and shining flowers, whereas *tuberosa* (Tuber-osa) refers to tuber-bulb.

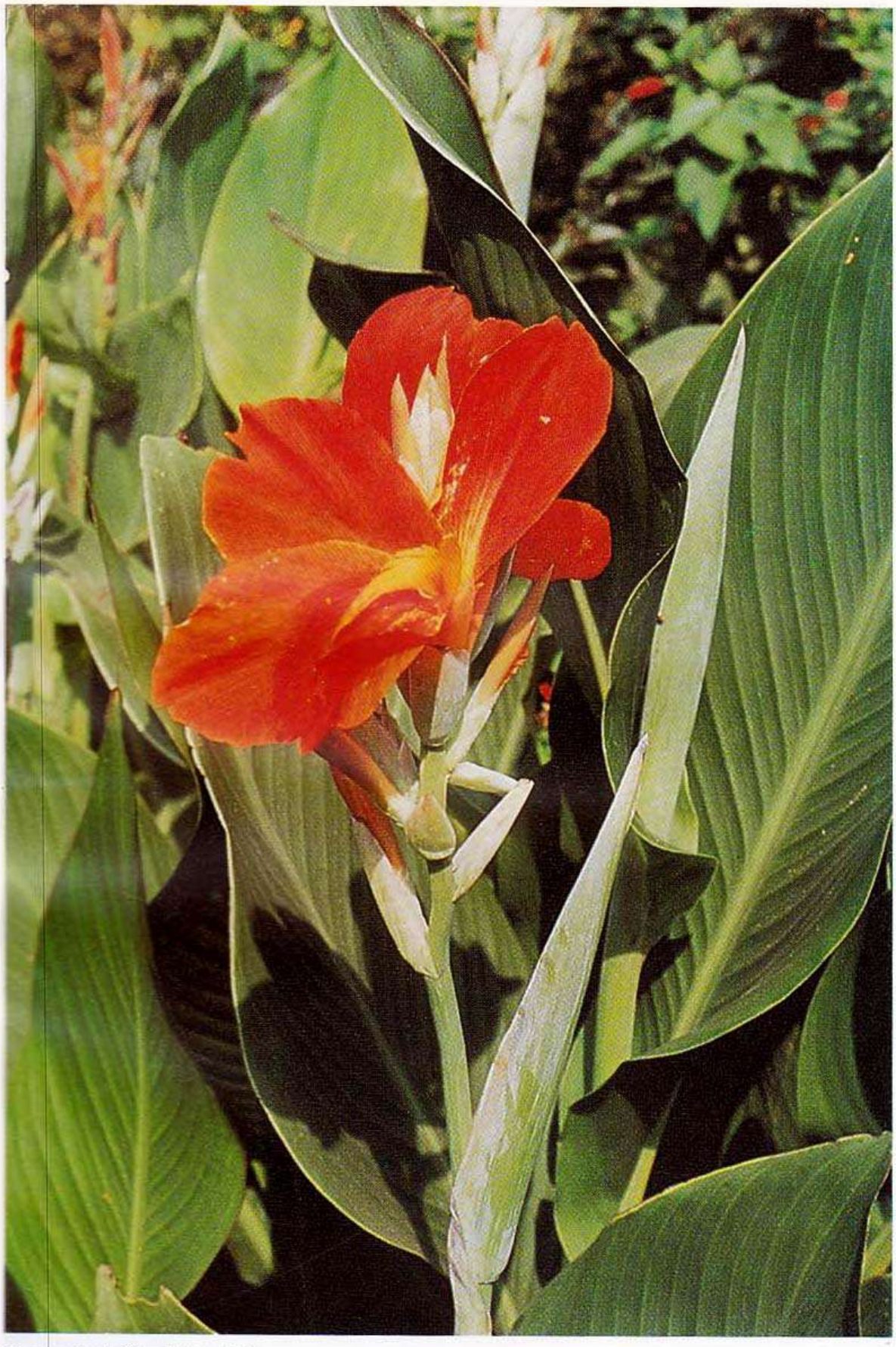
Herbs, perennial, erect, 60-120 cm tall; with bulb-like tuberous rootstocks; leaves grass-like, deep green, linear, those on the stem much shorter; flowers on spikes, arising from the clustered leaves, buds tubular, 2.5-4 cm long, opened flowers waxy-white and deeply fragrant, 5-6 cm long, bent near base, expanding widely and meeting the oblong, obtuse segments and looks like a lily.

Probably a Mexican or from the Andes of South America, but its wild form is not traceable; probably first introduced in Indian Botanic Garden, Howrah before 1794 and commercially in open fields, particularly in the state of Karnataka, West Bengal, Tamil Nadu, Andhra Pradesh, Maharastra and Gujarat, covering a large area. It is easy and cost- effective in cultivation and have long-lasting flowers, which remain fresh for 10-15 days in fields and 7-10 days in the vase, filled with water.

It flowers during April-September in plains of Eastern India, July-December in northern India and May-June in hills, however, in other parts of the country having moderate

Canna (Hybrid) - tall variety

Canna (hybrid) - dwarf variety



Canna (hybrid) - tall variety

Canna (hybrid) - dwarf variety

Rhizomatous roots of Canna

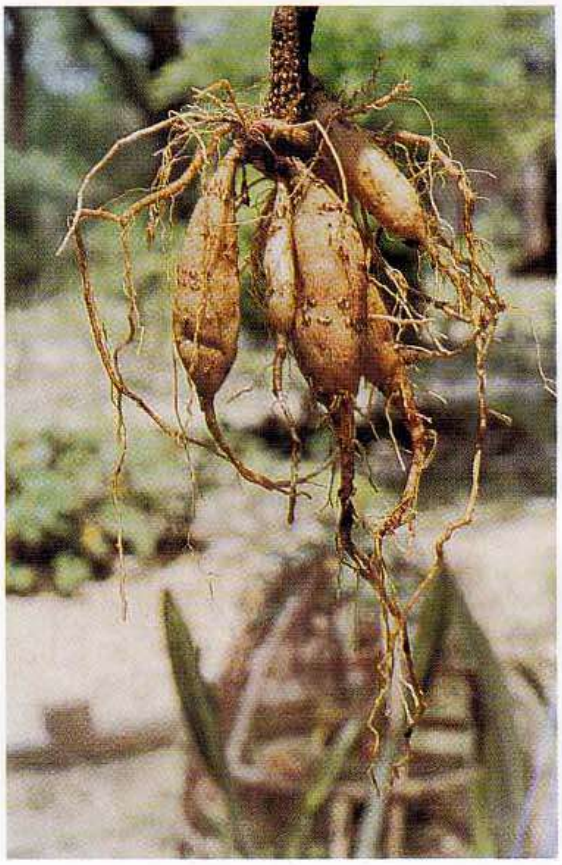
Crinum asiaticum - in flowers

Giant spider lily in flowers

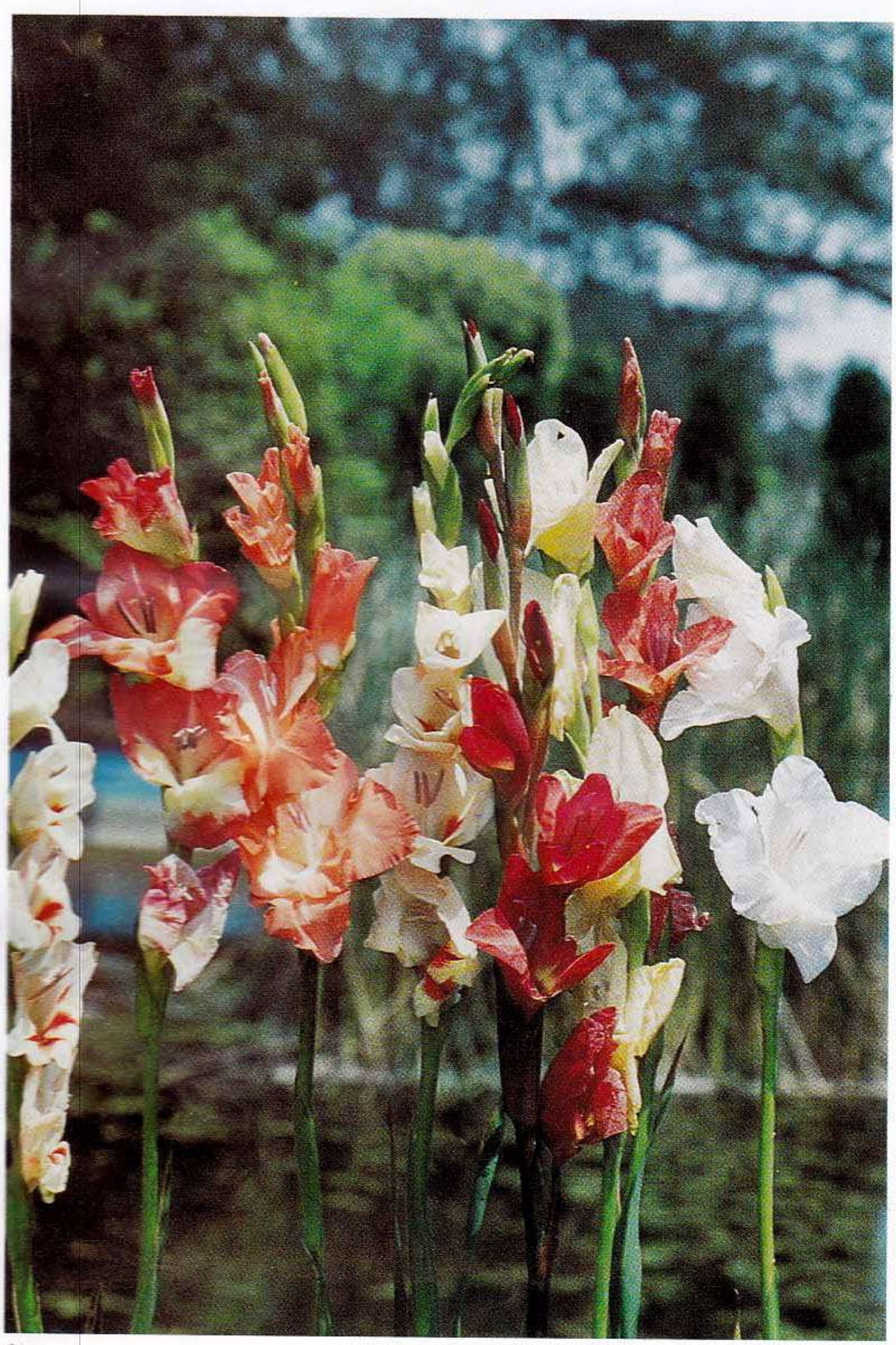
Dahlia ' Formal Decorative'

Dahlia ' Informal Decorative'

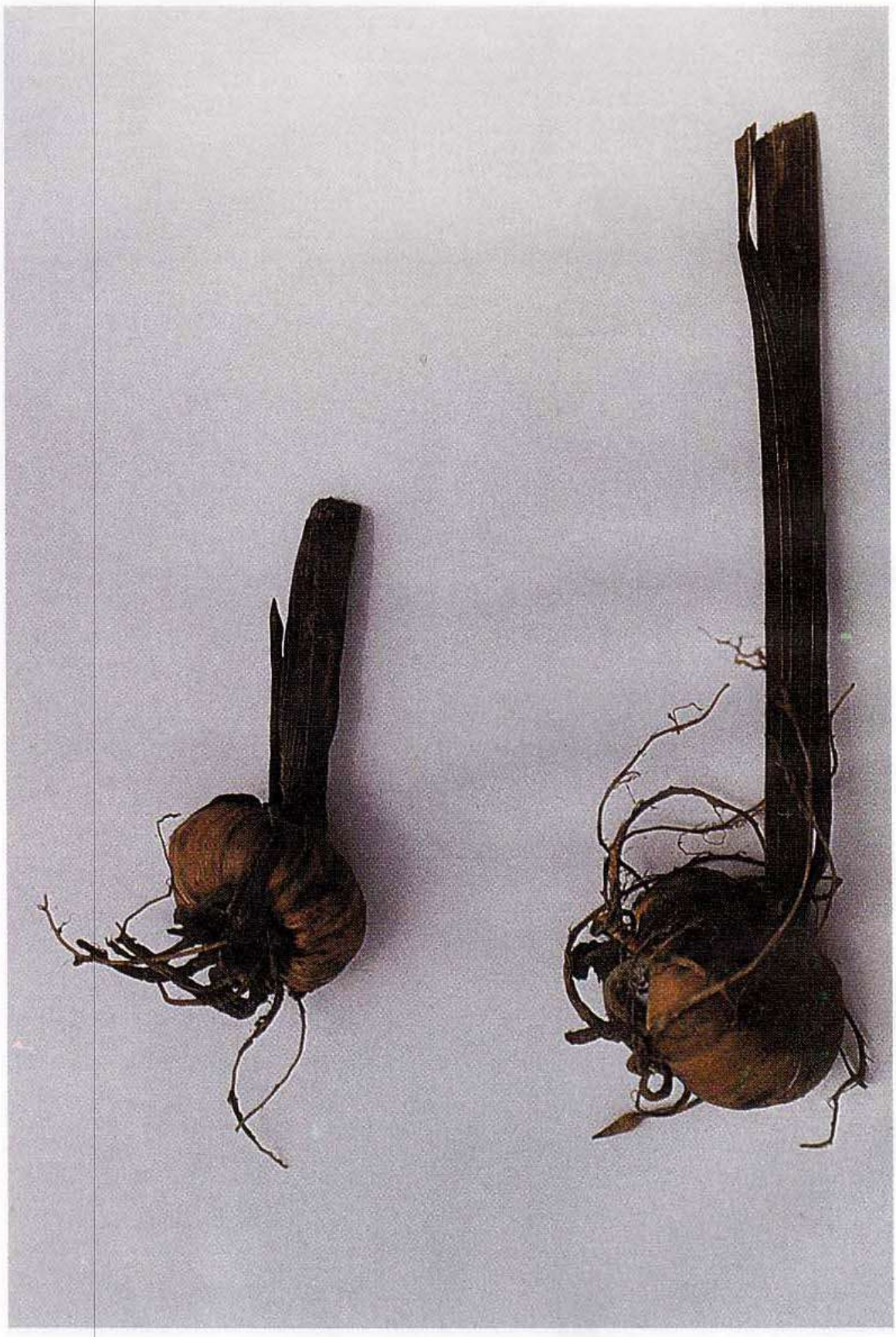
Dahlia ' Cactus Flowered'



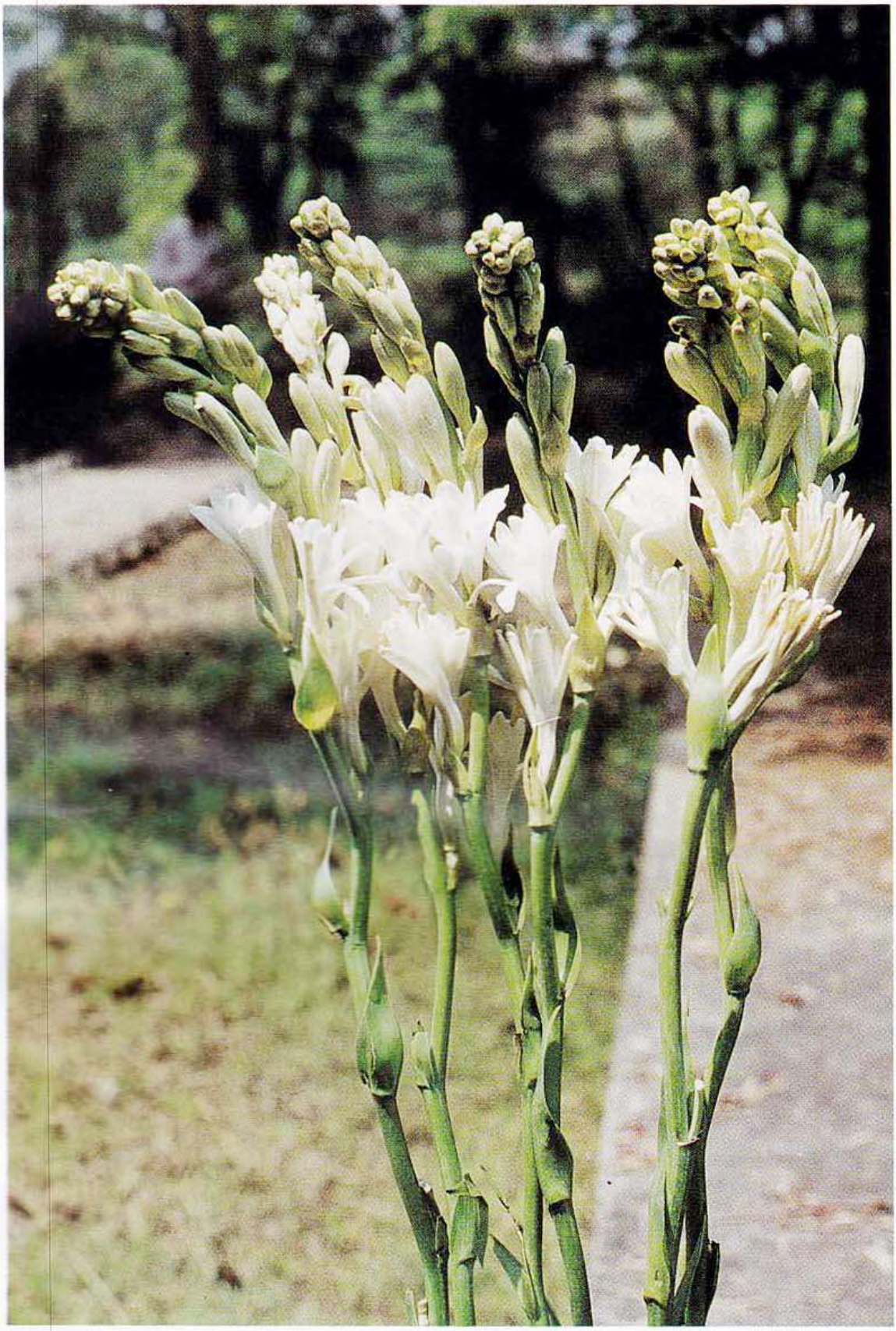
Tuberous roots of Dahlia



Gladioli (Hybrids) - in flowers



Corms of Gladioli



Tuberose - in flowers

Tuberose - commercial cultivation

Tuberose - bulbs and sprouts

climate it flowers almost throughout the year. Though it can be propagated through seeds it is commonly planted by division of offshoots.

Tuberose prefers sunny or semi-shaded site and grows well in loam and well-worked clayey-friable soil with good drainage. Soil should be dug and mixed with well-rotten farm-yard manure, bulbs are planted at 4-7 cm deep and spaced 25 cm apart between each row. In plains, planting is done in February-March, whereas in hills during April-May. For commercial cultivation and to obtain high yield, 30-40 tons of compost per hectare and 200 kg phosphorus and potash are applied before planting and 300 kg nitrogen in 2 equal parts and 200 kg phosphorus per ha in each year after sprouting and before the commencement of flowering, followed with irrigation. Fields are irrigated soon after appearance of sprouts and later on with regular intervals of 7-8 days. Generally, floralspikes emerge after 90-110 days of planting and are cut after 1 or 2 flowers bloom in evening time. For loose flowers only grown buds are hand picked.

For pot cultivation, 20 cm size pots are filled with soil, compost and leafmould in 2:1:1: ratio and 1-2 bulbs of about 2-5 cm diameter are placed about 4-7 cm deep.

Bulbs are taken out from the ground after 3 years and stored in cool, dry and shady site and replanted after separation, selection and dipping of bulblets in Blitox.

Plants affected by grass hopper are treated by 0.1% Rogor or 0.1% Malathion spray at fortnightly intervals; for weevils-dust the soil with BHC before planting; Aphids are controlled by spraying 0.1% Malathion at 10 days intervals or spray with Dimethoate (Rogor); Thrips are checked by spraying with 0.1% Rogor or 0.1% Malathion; red-spider mites are controlled by spraying Kelthane; whereas stems affected with stemrot disease are controlled by mixing with Brassicol or Zeneb at 3-week intervals or dusting of Brassicol (20% at the rate of 30 kg per ha or Mercuric chloride at 0.1% and 0.2% commercial Formaline; leaves affected with spots and blight are controlled by spraying with Ammonical copper, 2 galons per 100 galons of water or greeno and sodium salt or 0-Hydroxydiphenyle 1:200 and repeated at fortnightly intervals; and in case of floral-bud rot, plants are segregated and applied with corrosive sublimate (1 part in 1000).

Besides normal, single flowers, tuberose also have semi-double and double flowers, tinged with red or light pink. Cultivars like 'Pearl' or 'Dwarf Pearl' Excelsior (double flowers); 'Mexican single' (variegated leaves with single flowers) are also under cultivation. 'Rajat Rekha' and 'Suarna Rekha' are recently evolved cultivars. Varieties with double flowers contain less fragrance in comparison to single flowered varieties.

In addition to its decorative value, this flower yields a perfumed oil, known as tuberose oil.

TREES

Ashoka

The plant is generally known in Indian Languages as Ashok or Ashoka (Hindi and Bengali), Jajundi or Asoka (Marathi), Ashopalava, Asupala (Gujarati), Asok or kankelo (Telugu), Oshoko (Oriya), Asogam (Tamil), Aksunkar or Asokadamare (Kannada) and Asokam or Hemapushpam or Varijulam (Malayalam); Botanically called *Saraca asoca* (Roxb.) De Wilde (or *Saraca indica* L. or *Jonesia asoca* Roxb.) of Caesalpiniaceae family.

Generally confused with Mast tree (*Polyalthia longifolia*), also called 'Ashoka' or devadar in some parts of the country.

Saraca is derived from the Sanskrit name, 'Sara', meaning coloured, spotted and *asoka* has been named after its Asiatic name, ashoka, meaning sorrowless.

A native of India, Myanmar and Malaya, much planted in parks and gardens for its graceful foliage as well as for its bright scarlet-orange 'Ixora-like' blooms it is also considered sacred by Hindus. As per mythological and religious beliefs, Ashoka is a symbol of love and is dedicated to KAMA, the God of Love. Sita, wife of Lord Rama was abducted by Ravana and given shelter in a grove of Ashoka Trees in Sri Lanka. Buddhists also consider it holy and religious. Married women consume the floral-buds in the month of 'Chaitra' (March-April) to keep off from sorrow and grief to their children.

Ashoka trees are handsome, evergreen, medium-sized, 3-5 m tall with erect trunk having dark-brown or purplish brown, smooth bark. Branches spread in all directions forming a dense, elegant crown. Leaves alternate, compound with 6-12 leaflets of 30 cm length, without terminal one, usually dark green but in young stages drooping down, thin, pinkish-brown or coppery-red, change to green and become stiff which add a characteristic beauty. Flowers appear in large clusters, in corymbs with orange, orange-red or orange-yellow having sweet fragrance, changes to red colour, beautifying its scenic appearance. Fruits (pods) are similar to large beans, 10-20 cm long and 5-7 cm broad, thick with slight pink or purple colour when in young stage, later brown or black and contain 4-5, large, pea-like seeds.

Though it flowers during February to September, occasional flowering is seen in most parts of the year. Fruits appear abundantly during May to August.

Easy to propagate through fresh seeds; many self germinated seedlings are found below the parent trees which can be planted in desired site, and flowering starts within 4-6 years. Plant needs semi-shaded areas to grow; in hot climate proper shade should be given to save it from heat and sun-burn.

Tree is also considered of medicinal importance, flowers pounded in water are given in haemorrhagic dysentery and in diabetes. 'Ashokarishta' – an Ayurvedic medicine, prepared from bark is given for menstrual troubles and general ladies' weakness.

Suitable for planting beneath large trees as a second tier tree, at a distance of about 5-7 m.

Bottle Brush

Also called Red or Scarlet bottle brush and Mountain Rata; in Hindi Lal botalbrush and Botol brush in Bengali; botanically known as Callistemon citrinus (Curt.) Stapf (or *C. lanceolatus* DC.) and belongs to Jambolana or Myrtle family-Myrtaceae.

The name, *Callistemon* derived from two Greek words 'kalos' or 'kalli' meaning beautiful and 'stemon', refers to stamens and *citratus* in Latin meaning–coloured or like and *lanceolatus* in Lanced-shaped leaves.

A native to Australia, the tree is very commonly grown in gardens and parks for its graceful, willow-like leaves and showy blossoms producing numerous tufts of brilliant crimson or red flowers on drooping branches which resemble a bottle-brush, it looks very pretty and attractive amongst green foliage.

Shrubs or small trees are evergreen up to 5 m tall having rough and brown crooked stem and drooping branches. Leaves are small, thick and pointed, light green, however reddish green in young stage and drooping. Flowers are small, red or crimson, appear in clusters on cylindrical spikes. Fruits are small, oval shaped with numerous seeds.

Flowers almost throughout the year (except in winter) but profuse during March-April and October-November.

Generally, propagated through seeds, cuttings and by air-layers. Plants raised through seed take about 3 years to flower.

Best suited to grow in warm, humid climate and moist soil, it can be nurtured with little care. A slow growing plant, suited for planting near lily pools, at the back ground of small shrubberies and also along boundaries of small gardens.

Wood being hard and heavy, is very much suitable for preparing toys, shoe-heels and decorative carvings.

Callistemon pollandii Bailry (after Rev.W. Polland, Australian Plant Collector) also of Australian origin, has been recently introduced in some Indian gardens. Shrubs or small trees, up to 4 m high and pendulous branches. Floral filaments of stamens are dark-red (brick-red) with yellow anthers; appearing from February-April.

Propagated through seeds, cuttings and air layers.

Best suited on lawns in shrubbery borders or as a single specimen.

Champak or Golden Champa

Known as Yellow Champa or Orange Champak or Fragrant Champa, it has many

Indian names: Champa, Champaka (Hindi), Sworna Champa (Bengali), Rivala-Champa, Sona-champa (Marathi), Champo or Raechampo or Pito-champo (Gujarati), Tita-sopa, bolnabat (Assamese), Chompa, Chompaka, Kanchena (Oriya), Champakam (Malayalam), Shembuga or Chambugam (Tamil), Champakamu (Telugu) and Sampige or Kole-sampige (Kannada); is botanically called *Michelia champaca* L. of Magnolia family – Magnoliaceae.

Michelia is named in honour of Peter Antonio Micheli (1679-1737), a reputed Florentine Botanist and *Champaca* is taken from the Sanskrit name 'Champaca'.

It is of Indian origin and distributed in tropical and subtropical forests, up to 600 m, particularly in low hills, found almost in every state of India and often planted near temples for its religious importance as flowers are associated with Lord Vishnu – and also planted in gardens, parks and private houses for its magnificent, evergreen and beautiful shade and pleasant, fragrant flowers.

Trees—evergreen, up to 25 m tall with grey, spreading branches which terminate into a beautiful thick top, forming a conical crown. Leaves—alternate, simple, shining-green and large (15-25 cm × 5-10 cm), and sometimes with wavy margins. Flowers—yellow or dull-orange, about 5 cm across, heavily scented, in the axils of leaves. Fruits—globose, in clusters and contain many scarlet or reddish or brownish seeds.

Champa oil, obtained from flowers is used in preparation of Attar, hair oil, etc. Bark yields tannin. Flowers are used to cure stomach pain, nausea, fever, in renal diseases and root and bark used as purgative. Wood being hard, is suitable for preparation of posts, boards, decorative fittings, furniture and ship building.

Flowering starts during March, continues almost throughout the year and fruits during July to October. Easily propagated through seeds, stem cuttings and layers, and flowers within 3-4 years, the plants can easily be grown in any soil and climate. They grow and flower luxuriantly in rich fertile soils in moderate temperature and humid atmosphere. As avenue tree, it can be grown with 5-10 m spacing.

Copper Pod or Rusty Shield Bearer

Yellow Flame tree, Yellow Gold Mohur, Braziletto Wood and locally called Pili Gul-Mohur (Hindi), Arunjyoti, Radha Chura (Bengali), Kondachinita (Telugu), Ivalvagai perun-gondrai in Tamil; is scientifically known as *Peltophorum pterocarpum* (DC.) Backer ex K. Heyne [or *P. inermis* Roxb. or *P. ferrugineum* (Decne.) Benth.] and belongs to family Caesalpiniaceae.

Peltophorum is based on the Greek word 'pelte' – a shield and 'phoros' bearing, referring to shield-shaped stigma and *pterocarpum* also meaning shield-bearer (denoting shape of fruits).

Trees—deciduous, 10 to 15 m tall, with smooth, grey bark, large branches and thick crown. Leaves—feathery with dark green small leaflets. Flowers—yellow in large panicles of clusters at the ends of small branches, seated on copper-red downy-calyx. Fruits (pods)—bronze coloured and contain single broad winged seeds.

Native of Sri Lanka, Andamans, the Malaya Peninsula and Archipelago and North Australia the tree is very commonly planted throughout gardens and in parks, as road

side tree for its fairly dense shade, golden yellow flowers and for conspicuous copper shield-shaped fruits.

Flowers March-May, September-November and fruits during June-December and remain on tree till next flowers come.

Propagated through seeds and also by stem cuttings. Plants, raised through seeds, flowers within 3 years. It is well suited to grow in arid and moist localities and can be grown with little attention; branches emerging from the main trunk, near ground require to be pruned off to maintain good bole.

Wood has many uses, is suitable for making planks, cabinets, coach building, and bark yields tannin.

Flame of the Forest

Known as 'Dhak', 'Palash' in northern and eastern regions of India, Palasha (Sanskrit), Khakra (Gujarati), Moduga (Telugu), Kattamurukku, Parasa (Tamil), Mattuga (Kannada), Brahmavriksham, Palasi, Samatha (Malayalam) and also called Parrot tree.

Scientific name is *Butea monosperma* (Lamk.) Taub. (or *Butea frondosa* Roxb.), it belongs to the Pea family-Fabaceae. *Butea* is named after the Botainist John Stuart, Earl of Bute (1713-1792), and *monosperma* in Greek means 'With one seed' and *frondosa* in Latin means covered with leaf.

Common throughout the greater part of India (mostly hotter parts) ascending the Himalayas up to 900 m and in Peninsular India up to 1200 m in the coldest and arid regions.

Though not a garden plant but planted occasionally for its ornamental flowers.

Medium-sized, 10-15 m tall trees have rough, crooked, light brown or grey colour trunk; leaves are three-foliate, hairy, broad and green, attached to a control stalk, falls-off during winter. Flowers are large, yellow, orange-scarlet, deep orange and in variety of shades (rarely white) resembling beak of parrots, appear on totally defoliated trees, the scenic beauty very rightly justifies its name 'Flame of the Forest'. The single large brown and flat seed is found in flat pods measuring 10-15 cm long and 2.5 cm broad.

Flowers during February to April, and continues for nearly a month and fruits appear from May to June. Propagated from seeds, sown in humus soil.

All parts of the tree are considered to be of economic and medicinal value. Leaves used for preparing dish-plates, umbrellas; flower yields yellow dye; root-bark gives rough fibre; bark yields gum (called Bengal Kino) used in diarrhoea; wood-pulp is suitable for newsprint and tree serves as a host for lac insects.

Tree is considered sacred by the Hindus, used in sacred fire, thread ceremonies and leaf is also considered sacred – the middle leaflet is supposed to represent 'Vishnu' the left 'Brahma' and the right 'Shiva'. Flowers are associated with folk-songs, offered to Gods, much liked by Buddhists and also appreciated by the great poets like Amir Khusroo, Turkeman and Nobel Laureate Rabindranath Tagore.

Generally, plants are grown by sowing seeds. Seeds are covered with soil which germinate within 7 to 15 days. It can be grown by transplanting seedlings with fair success,

raised in nursery at a distance of 10 cm × 10 cm. Seedlings are transplanted at a distance of about 10 to 15 metres, generally no manure is given and requires little care to grow. Dried, decayed and odd-looking branches are to be pruned off after flowering. Hardy and slow growing, it can be grown in drought-affected and even in poor soils. It grows in water-logged situations, on saline, alkaline and swampy, badly drained soils. Geham borer destroys its wood; affected, sick and drying plants are to be removed as soon it is detected.

Gold Mohur or Peacock Flower

Also called Flameboyant tree, Flame tree; Gulmohar (Hindi), Krishna chura, Golmohor (Bengali), Ettaturayi Vadnarayan, Shima sankesula (Telugu), Mayuram, Mayirkkondrai (Tamil) and Doddaratnagandhi (Kannada).

Gold Mohur is a corrupt name of Gul Mohar. 'Gul' meaning rose flower and 'Mor' in Hindi meaning Peacock and the word 'Mohur' also denotes an old Indian coin or seal.

Its scientific name is *Delonix regia* (Boj. ex Hook.) Rafin. under family Caesalpiniaceae. *Delonix* has come from the Greek 'Delos' meaning conspicuous or evident, 'Onyx' means anything resembling a claw or nail, referring to the shape of the petals and *regia* in Latin means royal which altogether means a marvellous view of the flowers.

Trees—medium-sized, 10-15 m tall, deciduous, having grey and smooth trunk; long out-spreading branches which form an umbrella or dome shaped canopy. Leaves—compound, having innumerable fine and shining leaflets. Flowers—7 to 10 cm across with brilliant red or orange petals except the upper one, with yellow or white stripes. Flowers appear on the ends of barren or leafless branches which present a magnificent look when in full bloom. Pods—flat, 40-60 cm in length and 5-7 cm broad containing many large seeds which hang on trees for longer periods.

Flowers in April to June, and fruits during June to October. Being a fast growing tree, it flowers within 3 years.

The native home of the tree is Madagascar. They are now very common in gardens, parks and planted on avenue for its feathery delightful foliage, and suitable for good shade and for magnificent and picturesque flowers.

Generally they are propagated through seeds sown during the onset of rains. Seeds remain ungerminated up to 2 years and therefore require hot water treatment for easy and quick germination. It can also be propagated through stem (pole) cuttings. It is suitable to grow in any shallow soils, having even less fertility. It grows well in warm humid climate but water-logged area is unsuited for proper growth.

Branches are liable to be easily broken by high winds. It has shallow root system and anchoring, hence grasses and other plants cannot thrive well beneath this tree. Generally no pests and diseases are known to affect this tree.

Gum, obtained from seeds, used in food and textile industries.

Planted along road sides alternatively with Indian Laburnum (Amaltas) having golden-yellow flowers presents a marvellous picture.

Golden Amaltas or Indian Laburnum

It is also called Golden-Shower or Pudding-Pipe-Tree or Purging-Cassia or Purging-Fistula, and its local names are Suvarnata, Rajatam (Sanskrit), Amaltas (Hindi), Bandarlathi, Sondala or Sonali (Bengali), Bahava (Marathi), Garmala (Gujarati), Konnai (Tamil), Rela (Telugu) and Kakke (Kannada).

Its botanical name is *Cassia fistula* L. under Caesalpiniaceae family. *Cassia* is derived from the ancient name 'Kosia' or 'Kassia' and in Latin 'casia' whereas *fistula* in Latin means a tube, referring to its long, tubular fruits.

It is found wild in deciduous forests throughout the hotter parts of India, ascending up to above 1000 m in the foothills of Himalayas. Very extensively planted almost in all parks and gardens as avenue trees for its long, pendulous and golden-yellow flowers which create a picturesque effect. Plant is also considered religious, particularly in Karnataka, wherein tree-stakes, fixed in the ground are worshipped. The tree is favourite to traders and merchants as it is associated with prosperity in trade. Trees are medium-sized, up to 10 m tall with smooth-greenish bark and irregular branches. Leaves are large, dull green with 3-8 leaflets. Flowers—golden-yellow and on aging turn pale or lemon yellow, appear on the large and pendulous racemes, open from uppermost downwards, forming an inverted pyramid in appearance. Fruits—cylindrical, 15-60 cm long, round green, on maturing blackish-brown and contain 40-60 shining seeds. Fruits hang on trees for longer part of the year and represent a characteristic feature.

Trees shed their leaves during winter, followed with flowering (April-July) and green pendulous fruits appear during June-July, which are found hanging nearly up to the next flowering season and fall down during rainy season.

Seeds are sown during March-April and watered regularly. Fresh seeds germinate less in number and even take longer period, sometimes up to 2 years as compared to seeds collected from old pods hanging on trees or lying on the ground. Generally seeds are soaked in hot water or sulphuric acid for 2 to 5 minutes to soften its hard seed coat enabling easy germination. Plants are easily grown in dry areas and even in poor soils. Due to slow-growing habit, plants take time to attain good size and growth.

Plants are not eaten by cattle.

Wood is hard and used for various agricultural implements. Whole plants are considered to be laxative. Leaf juice is given to cure skin troubles.

Other important species of *Cassia* having good flowers found wild or commonly cultivated are:

Ringworm Cassia or Candalabara Bush (*Cassia alata* L.,) 'Dad-mardan' (Hindi), Dadmari (Bengali); is a shrub with branched habit and graceful foliage. Leaves—30 cm to 1.00 m long, having 16 to 24 broad leaflets, obovate, broad-oblong. Flowers—golden-yellow, erect, candle-like spikes of large, bracteate racemes. Fruit—a flat pod, 10-15 cm long with 4-crenulate wings having many, small, brownish seeds.

It is a native of West Indies, found wild in many areas and also planted in gardens. Flowers and fruits during April to December. Seeds germinate easily and produce flowers and fruits within a year.

Leaves are used to treat ringworms.

Horse Cassia or Pink shower (*Cassia grandis* L.f.) – having its native home in tropical America and the Caribbean Islands, now grown in many parts of India, in gardens, parks and in township plantation for its showy flowers, are eye-catching in full bloom.

Tree—deciduous, up to 15 m tall having stout trunk with fairly smooth, grey bark. Branches—drooping, growing widely, but with compact growth which form a round crown.

Produces deep green foliage, and terminal leaflets of the younger leaves have coppery-tinged colour, velvety, 10-40 oblong, narrow leaflets and these are abruptly rounded at both ends. Pale-pink flowers are borne in clusters after the leaf-fall during winter. Fruits (pod)—about 8 cm long, cylindrical and transversely wrinkled with many seeds.

Flowers during February to April and fruits from April to September.

Pod pulp is used as a purgative.

Java Cassia (*Cassia javanica* L.), a plant of Java and Malaysia, now it has got its place in Indian gardens, parks and also in township plantings along roadsides for its beautiful bright-pink flowers. A tree of medium size, with spreading branches and umbrella-shaped canopy. Leaves are paripinnate, up to 30 cm long, having 16-28 oblong, obtuse and broad green leaflets. Flowers appear on erect, short branchlets near point of fallen leaves. Middle part of the filaments possess egg-shaped small swellings and have double curves below it. Pods are cylindrical, about 50 cm long and about 2 cm in diameter, dark brown with smooth surface.

Flowers during April and May.

Easily propagated through seeds. *In-situ* planting is recommended for its better survival and growth, otherwise seeds are sown in polythene bags and planted out in rainy season. Plants require shade, therefore should be grown underneath large trees.

The Burmese Pink Cassia (*Cassia renigera* Wall.) – The tree originally belongs to Myanmar, now grown in Indian gardens and parks for its very beautiful, pink and scented blooms. The new leaves alongwith flowers enhance its beauty and are considered the most beautiful of all Cassias. A fast growing tree, up to 7 m high, trunk is short having grey-bark with many, corky abnormal growth. Leaves are hairy in 13-20 pairs, oblong, kidney-shaped with small and green appendages at the base of leaves. Flowers appear in clusters on the bare parts of the branches. Fruits (pod)—cylindrical, smooth, up to 30-60 cm long and black.

Flowers during April and May.

Plants are raised through seeds; grows and flowers luxuriantly in moist as well as in dry climate and even in poor soils.

Red Cassia or Ceylon senna (*Cassia roxburghil* DC. (or *C. marginata* Roxb.): small trees, indigenous to South India and Sri Lanka and planted along road sides or in a group in gardens for their umbrella-shaped canopy and for numerous, beautiful, salmon-red or terracotta colour flowers. Leaves are 15-30 cm long; leaflets 10-15, about 2.5 cm long, oblong, bright, emarginate, slightly thickened at margins. Numerous small flowers appear on short axil of racemes and also in terminal panicles on the arched-branches; bracts persistent, petals not veined; fruit—a pod, cylindrical, straight and smooth, about 20-30 cm long.

Flowers during June-September and fruits from September-March. Easily propagated through seeds and well suited for hot and dry climates.

Indian Coral Tree

It is also called Mochi Wood or Bastard Teak; Parijat mandar (Sanskrit), Pangara, Dadap, Mandara, Panjira, Phorad (Hindi), Palita Mandar, Phaltemadar, Rakta madar (Bengali), Pangara, Madar (Marathi), Bangaroo (Gujarati), Bariganu, Bodisa, Modugo (Telugu), Kalyanamurukku (Tamil), Varipe harivana (Kannada), Kalyana Murrukku, Mandaram (Malayalam).

Botanically called *Erythrina variegata* L. (or *E. indica* Lam.) under family Fabaceae. *Erythrina* is derived from the Greek work 'erythos' meaning red colour of flowers, and *variegata* or *indica*, refers to variegated leaves and place of nativity, respectively.

Distributed commonly throughout India, from foot hills of Himalayas to southward and often being cultivated.

The tree is supposed to flower in Indra's garden, and as per a mythological saying Rukmini and Satyabhama (the two Queens) quarrelled for possession of this flower which was cleverly stolen by Lord Krishna from the garden. The three leaflets of one leaf are also supposed to represent the Hindu 'Trimurti—Brahma, Vishnu and Shiva'.

Medium to tall, deciduous trees, 8-15 m tall having yellowish or greenish, grey smooth and shining bark, which peels off like paper, with many straight, armed branches having conical, black prickles. Leaves are dark green or variegated, round, slightly pointed at tips with 3-leaflets. Scarlet or deep red (rarely white) flowers resembling a beak, appear in clusters in terminal branches in leafless condition, look remarkable due to its brilliant colour. Large fruits (pods), narrowed at both ends in moniliform shape with 6-8 egg-shaped smooth seeds embedded therein appear abundantly and look remarkably hanging on trees for long periods.

Flowers during February to March and fruits during April to September.

Propagated through seeds and stem (pole) cuttings, having a length of about 1-1.5 m with the minimum 30 cm diameter girth of stem is planted directly at the desired site, and can be grown with little care except occasional watering and interculture, and blooms appear within two years. Plants are required to be pruned to maintain its growth.

Very commonly grown in gardens for its showy, brilliant colour of flowers and as avenue trees; being very fast in growth, it is suitable as wind-breaks and generally planted in villages for close hedge due to its prickles.

Besides its floral beauty, plant is of economic importance. Stem yields fibre; leaves are fed to cattle and used for green manure. Stem serves for fencing and supports twiners. Leaves are given as laxative, stem used for paper-pulp and fresh seeds are edible after boiling and roasting since fresh seeds are poisonous.

The two other species, commonly grown in Indian gardens and parks are:

Cockspur Coral tree (*Erythrina crista-galli* L.), is a tree having short trunk and spiny branches. Flowers—showy, large and crimson coloured, during February to May and branches die away after flowerings are over. Propagated through cuttings and air layerings. Its native home is Brazil and now have found its place in many gardens. Dried branches are removed to promote new shoots to arise and for good bloom.

Blakei Erythrina (*Erythrina blakei* Hort. ex Parker), is a hybrid form of small tree, produces beautiful scarlet flowers during April to May, is commonly grown in north Indian gardens. Propagated through air layerings.

Nag Keshar or Iron-Wood Tree

Its local names are Nag champa, Nageswar (Hindi and Bengali), Nahar, Dieng-angai (Assamese), Nag-Champa (Marathi and Gujarati), Nangu, Nagachampakam (Tamil), Naga sampige (Kannada), Nagkesara (Telugu), Gangane (Andamanese) and Velluthapala (Malayalam).

Botanically named *Mesua ferrea* L. belongs to *Garcinia* family – Clusiaceae (or Guttiferae). *Mesua* is named in the honour of Joannes Mesue, Arabian Physician and Botanist and *ferrea* means rusty coloured leaves at their young stage.

It is a native of India and Malaya and mostly found in eastern and western peninsula and hills of eastern Himalayas (Lower Bengal, Assam) and in Andaman islands. It is common in its natural habitat but has not yet been much planted in gardens and parks except in Botanical gardens and in only specialised gardens for its dense graceful foliage and beautiful pyramidal form as well as for fragrant, delightful scented, Magnolia-shaped flowers.

Trees are evergreen medium-sized up to 15 m tall; bark — smooth and dark grey; leaves—small, opposite in pairs, leathery, lancet-shaped, polished, glossy on the upper and whitish beneath, new leaves are brilliant red, changing to deep green and stiff on ageing. Flowers—large, white, having 4 petals, 4-6 cm across; many stamens thread like, yellow and crowded in the middle which emit delightful scent. Fruit—oval, pointed, contain 1-4 hard, dark brown seeds.

Flowering during February to May and fruits from May to October.

Plants are raised through fresh seed and do not withstand transplanting, but can be sown in polythene bags, filled with humus soil. Plants require porous soil, semi-shaded situations, and best suited to humid climate and if planted in sunny situations it requires proper shade. It is a slow growing plant.

Wood being very hard and tough is used for agricultural implements, railway sleepers, musical instruments, etc. The oil from seeds is used as lubricant, in illumination and also in soap industry. Flora-bud is given to cure dysentery and flowers to relieve cough.

Tree is also considered sacred by Hindus.

Plumerias or Frangipani

Plumeria are shrubs or trees belonging to botanical family Apocynaceae, native of Tropical America, named in honour of Charles Plumier (1646-1704), a monk and French Botanist who travelled in America for plant systematics; very commonly planted in gardens near temples for its sweet fragrant and showy flowers. Stems are thick and soft, with white milk. Leaves are narrow, spirally arranged near ends of branches with nerves prominent on dorsal side and marked with scars from fallen leaves. Flowers appear in large clusters in leafless condition, 5–lobed with tubular, jointed near base, in varying colours from white, red, pink, yellow and many other shades. Fruits are large in pairs, but jointed near the base, with many flat seeds. Flowers throughout the year and propagated through stem cuttings by planting in light soil during February–March.

Most commonly grown *Plumerias* are: White Champa, White Frangipani (*Plumeria alba* L.), Safed kath Champa (Hindi), Vegvi Varachaalu (Telugu), Perumal Arali, Seemai arali (Tamil), Vella champakam in Malayalam.

Trees are small, about 5 m tall, with smooth and grey bark. Leaves are rigid, brittle, round at the apex, smooth above, hairy underneath and curled inwards at the margins. Flowers are almost white or white with yellow throat, fragrant and rounded petals.

Flowers in February-April and fruits during April-June.

Tree is native of West Indies, grown in parks, gardens and near temples for beautiful foliage and particularly for very sweet, fragrant flowers. Tree remains in leaf throughout the year.

Fruits are edible and latex used in ulcers, scabies; bark is a stimulant, purgative, applied and a cure for itches, rheumatic pains and gum troubles.

Temple or Pagoda tree (*Plumeria rubra* L.), also popularly called Crimson Temple Tree, Red Frangipani, Red Jasmine tree, Khira Champa in Sanskrit, Gobur Champa, Lal Gulachin, Lal Gulanchi, Khair Champa, Son Champa (Hindi), Lal Gulancha, Lal Gonur Champa, Lal Katchampa, Dalan phul (Bengali), Kat Champa, Golachi (Oriya), Khair Champa, Son Champa (Marathi), Rhadha Champa (Gujarati), Nuru Vorahalu (Telugu), Arali, Kallimandharai (Tamil), Arali, Deva Gangile, Ezhachampakam in Malayalam.

Shrubs or small trees, 3 to 8 m tall, branches—slender, thick and brittle; bark—thick smooth, grey, shining and peels off in small flakes. Leaves—thick, long, broad pointed and shining green with conspicuous nerves. Flowers—born in terminal clusters of purple, red rose or crimson with or without shades of white or yellow having sweet fragrance and planted near temples, graveyards and in church compounds; it forms a picturesque carpet on the ground when flowers drop.

Flowers during February–October, less during winter season and fruits during July–October.

Propagated through stem cuttings and also air layerings.

Leaves are applied to cure swellings; latex applied for rheumatic pains and toothache; root is a purgative and also given to clear urination. Wood is used for making drums and other musical instruments.

Various forms based on colours such as *rubra forma* 'Bicolor' and forma 'Tricolour' are grown in gardens. ***Plumeria lutea*** has yellow flowers or sometimes white without pink or rose on the upper surface.

Plumeria obtusa: Leaves obovate with rounded apex, dark green and glossy having white with yellow throat of flowers.

Red Silk Cotton Tree

It is called Salmali or Rukka–pushpa, Kantakdruma (Sanskrit), Semul or semal (Hindi), Rakto Shimool (Bengali), Bouro (Oriya), Sawar or Simlo (Gujarati), Boruga (Telugu and Kannada), Muliilava illavam (Tamil) and Muliilavan (Malayalam).

Botanically called *Bombax ceiba* L. (or *Salmalia malabarica* Schott & Endl.), under

family Bombacaceae. *Bombax* is derived from Greek word 'bombyx' meaning the silky hairs surrounding the seeds; and *ceiba* is a vernacular name given in America, and *Salmalia* is latinised from Sanskrit word Salmali.

As per Indian mythological belief, Brahma, creator of Universe took rest beneath this tree after creating the universe. Considered sacred to Lord Shiva and also for being associated with Lord Buddha, who was born under this tree.

Deciduous trees—about 15 m tall, produce buttresses in old ones. Trunk—more or less cylindrical and spiny with grey bark and spreading branches arise in whorls at great height and grow horizontally in one upon other, bear short prickles during young stage. Leaves—large, digitately 5-7-foliate, emerge from the centre of stalk. Large number of flowers similar to gramophone, with fleshy petals varying from velvety red or crimson, yellow to red (rarely off-white) appear at the ends of leafless branchlets with numerous scarlet stamens, almost equal to the length of petals, and each bearing a single purple anther, enhances marvellous beauty when in full bloom. Fruits—oblong, tapering at both the ends, contain many dark brown, egg-shaped seeds covered with white-silky cotton.

Flowers during February to March and fruits from April to June.

Silky floss obtained from fruits are used for stuffing pillows and mattresses, gum attained from stem utilised as adhesive, fresh fruit paste applied on wounds to cure pain and in ulceration of bladder. Flowers are pickled and eaten. Wood also used in match manufacture.

Commonly propagated through seeds and pole cuttings and grow fast up to 2 m during first season. It can be grown with less care and management.

Sacred Barna

Popularly called Caper Tree, Bengal Quince and locally known as Varuna (Sanskrit), Barna Bilosi, Bila (Hindi), Barun, Tick toshok (Bengali), Vayuvarna, Kumla haruvarna (Marathi), Bilpatri, Bitusi, Hoddelenge (Kannada), Kili, Nirulla, Nirumaliyan, Varana (Malayalam), Bilvaram, Maredu (Telugu), Barun, Boryno, Varunol (Oriya), Anjani, Varanam, Maralingam in Tamil.

It is scientifically known as *Crataeva nurvala* Buch.-Ham. (or *C. religiosa* Hook.f. & Thoms.) and belongs to Caper family–Capparaceae (Capparidaceae). *Crataeva* is named in honour of Crateuas (1st century BC), a Greek writer on medicinal plants, *nurvala* is a south Indian vernacular name, whereas *religiosa* refer to its holiness or religious values.

Native of India and Myanmar, found in dry areas of plains, and planted in gardens, rarely in avenues.

Trees—deciduous, small up to 10 m tall; smooth thick grey bark; having dome shaped branches and trifoliate leaves on long leaf stalks; leaves—shining, glossy green above and pale beneath, on tips of the branches and mostly drop off in the winter season. Flowers are 5 cm across, creamy-white, turning yellow, in large clusters, mostly at the ends of branches, stamens about 15, purple or lilac, larger than petals in length; fruit—a berry, egg-shaped with many flat seeds within white flesh of pulp.

Flowers during March–May in leafless condition or on arrival of new leaves. Propagated through seeds and rootstocks, fresh seeds are sown during rains either in open fields or in containers followed with watering; seedlings are transplanted during the second rainy season and utmost care is required to protect the long tap root while transplanting.

Tree is considered to be religious and sacred by Hindus and Muslims hence planted near temples, mosques and near graveyards. Tree attains good looks for a short time when in bloom owing to the contrast between petals and stamens. It is suitable for dry climate and has got its place along city roads for its graceful appearance and require less care to grow.

Leaves are used to cure rheumatic and gout troubles. Bark promotes appetite and antidote to snakebite. Fruits are edible, wood light, used for matchsticks, combs and other small articles but susceptible to attack of insects.

Umbrella Tree

Also commonly called Portia tree and Tulip tree; local names are Bhendi, Gajahonda, Paras pipal, Porush, Parsipu (Hindi); Dumbla, Paras Pipal, Paresh, Gajashundi (Bengali); Bendi, Bhind, Parashapiplo (Gujarati), Bendi, Bhenda, Paraspipar, Ran bhindi (Marathi), Gangarani, Munigangarani (Telugu); Arasi, Asha, Bugari Bamgali, Gandarali, Hurvashi (Kannada), Chandamaram (Malayalam) and Kallal Piram and Pupparutti in Tamil.

Botanically called *Thespesia populnea* (L.) Soland ex Corr. – belongs to Mallow or Lady's Finger family Malvaceae. *Thespesia* is derived from a Greek word, 'Thespesia'–meaning divine, regarded as a sacred plant, noticed by Captain James Cook during 1769 near Tahiti temples and *populnea* refers to Poplar like or similar to Bhendi's leaves.

This handsome tree is native to India, found common in sea beaches and tidal forests and very widely grown along road sides, gardens and parks for well shaped crown having dense–shade and tulip–like showy flowers.

Tree is evergreen, medium-sized, 5 to 10 m tall with brown, rough-knobby bark and compact crown. Leaves are dark green, simple, alternate, broad, heart–shaped with long tail at the tip resembling *Peepal* leaves. Flowers are solitary or axillary, yellow, bell-shaped, similar to Gurhal or Show-flower (*Hibiscus*) which twist curiously and fade to light purple. Fruit is a capsule, globular with a depression in the centre with many, white, paper-like silky seeds.

Flowers throughout the year but profuse during February-September and fruits during summer months.

Propagated through seeds. Tree requires moist tropical climate and porous soil and grows fast with little care.

Hard wood used for gunsticks, boats, carts, furniture, musical instruments, etc. Bark possesses fibre; seeds yield oil, used as edible and as luminant. Whole plant parts are anti-scabies, psoriasis and also cures various skin diseases.

Yellow Flowered Silk Cotton Tree

Torchwood tree or Butter–cup tree, Kumbi, Galgal, Funeri, Gabdi (Hindi); Ganeri, Gangley (Marathi); Kongu, Kondagogu (Telugu); Kongilam, Tanakku and Hill Cotton tree (Tamil); Arasinaburga, adaiburga (Kannada), Appakutakka (Malayalam) and Kontapalas (Oriya).

The tree is botanically called *Cochlospermum religiosum* (L.) Alston of Cochlospermaceae family. *Cochlo* in Greek 'Kochlos' means 'snail, snail-shell', spirally twisted, *sperma* (Seeds) refers to the shape of the seeds and *religiosum* means religious and the flowers being offered to the God.

Out of about 11 species found in the world, only one species occurs wild in tropical deciduous forests of India, in dry gravelly soils up to 1000 m particularly found in Uttar Pradesh, Madhya Pradesh, Bihar, Orissa, Maharashtra and in South India. Very often planted in gardens and near temples for its beautiful, yellow flowers.

Small or medium-sized trees, they attain a height up to 10 metres, shed leaves during winters with stout, crooked trunk, pale grey bark and thinly spread branches; have broad, smooth and bright green leaves 8-16 cm in diameter, having 3-5 lobes, deeply cleft and pointed at ends. Leaves occur in a cluster on top of twigs. Large, pretty and eye catching, golden–yellow flowers appear on leafless trees, in large terminal panicles, which have 5–bluntly oval–shaped petals with deep cleft and irregular margin. Pendulous, egg–shaped fruits with 5–lobes possessing large number of kidney–shaped seeds, covered with soft silky wood, render special attraction which signify the tree from a distance. Leaves appear after blooming is over.

Flowers during January to March and fruiting from March to June.

Plants are easily raised by seeds, sown in July–August. Seedlings get ready to transplant within a year, being fast growing; it starts flowering in only two years.

Tree is also economically important. Gum obtained from bark called 'Kino gum' used in cigar pasting, cloth printing, book binding and in icecream industry. Fibre obtained from fruits are used for stuffing mattresses and life belts.

Suitably planted alongwith the other flowering trees, in the back of shrubbery, sides of large lawns and also in boulevards on roads. Also suitable to grow in rocky lands, hill slopes and withstands fire.

ANNUALS

China Aster

China Aster is a common annual, grown in gardens for its beautiful flowers, in various forms, size and colours like pink, rose, red white, blue, scarlet, crimson, mauve, purple, and retains freshness for longer periods, hence much in demand as cut flowers.

Botanically named *Callistephus chinensis* Nees, under family Asteraceae. *Callistephus*, in Greek 'Kallistephanos' meaning beautiful-crowned, also 'stephin', means to crown, said to be referred to the appendages of the fruit (achene), *chinensis* given on its nativity, China, it was introduced in Europe from China around 1731 by Jesuite Missionaries and in Indian Botanic Garden, Howrah by Dr. Buchanan during 1802.

Herbs—annual, 15-60 cm tall depending on forms and varieties, hairy; leaves—alternate, broadly ovate-triangular, deeply toothed, upper leaves spathulate and narrow. Flowers—solitary, appear on ends of branches, ray florets showy in many colours, 2.5-12 cm across with yellow disc florets, bracts green and large.

Some recommended forms and types are Comet, Peony flowered, Chrysanthemum-flowered, Washington Victoria, Mignon and Queen of the Market, and varieties commonly include: Perfection, Californian Giant, Powder-puff, Super Giant, Totem-pole, Dwarf-chrysanthemum-flowered, Dwarf-Queen Liliput, Giant Comet, Giant Princess, Giant Fully Supreme, Double Ball, Giant Harming, Flutty Fancy Fair, etc.

It prefers full sun and grows well in rich loamy soil, mixed with humus. In plains, seeds are sown in early September for flowers in January-March and in hills, seeds sown in March bloom from June onwards and continue generally for 3 months.

Before transplanting, soil should be well prepared, mixing with well decayed cow-dung manure @ 5-6 kg per square metre, 45-60 gm each of Sulphate of ammonia, Superphosphate and 15 gm Potassium chloride per square metre. Potassium permanganate sprays at every 10-15 days interval, after transplanting is considered beneficial, and liquid manuring enhances good growth and high quality bloom. Tall growing varieties need stakes. Regular watering is done for good and fresh flowers.

Leaf-hopper and leaf minor-affected plants are controlled by spraying with Parathion or any other contact insecticides; Potato-aphids are checked by spraying with lead arsenate two times; for plants affected with wilt caused by soil borne fungus, seeds are soaked for 30 minutes in 0.1% solution of mercuric chloride; leaf spot causes light yellowish lesions which change to dark brown and black – this can be controlled by spraying with zineb or maneb; and plants with rust causing bright yellowish-orange spots on lower surface of leaves in young plants is controlled by spraying with wettable sulphur during the growth period.

China Asters are well suited for general bedding, borders, around or in front of lawns and shrubberies and also cultivated in pots. Its cut flowers are in much demand for vase decoration and general display due to long keeping quality.

Chrysanthemum

It is locally called Chandramallika, Shevanti (Sanskrit), Guldawadi (Hindi), Chandramallica (Bengali), Shevanti (Marathi), Akkarakkaram, Javanti (Tamil), Chamunti (Telugu), Savintige in Kannada.

Belongs to Aster family Asteraceae (Compositae). *Chrysanthemum* is a Latin word and in Greek 'Chrysanthemon' means golden flowers.

It is a very popular plant for its flowers having various sizes and shapes; suited for bedding, cut flowers, floral arrangements, garlands and as 'Veni' i.e. adornment of hairs of ladies particularly in South India.

It is a native of Eastern Asia, supposed to be from Japan and is in cultivation for atleast 2000 years and is the National Flower of Japan.

Herbs—annuals or perennials with woody base, much branched, glabrous, pubescent, strongly scented; leaves—alternate, entire or lobed flower heads—white, pink, red, purple, yellow and with many mixed colours, single, semi-double and fully double; heads on long peduncles or in corymbose clusters; disc-flowers bisexual and usually fertile; the ray-flowers, mostly sterile, the rays entire or toothed.

The present day varieties mostly found in gardens are evolved through crossing between *Chrysanthemum morifolium* Ramat. and *C. indicum* L., hybridization and selection of mutants and sports are mostly divided into two main classes, annual and perennial Chrysanthemum; these are also classified according to form and arrangement of petals viz., 1) Small flowered type includes Korean single, Korean double, Marguerite, Charm or Cineraria, Quilled or Semi-Quilled, Pompon, Anemon, Cascade and Button type, whereas 2) Double flowered varieties include : Incurved, Incurving, Reflexed, Japanese or Irregular, Rayonate or Ball, Quilled and Semi-Quilled, Decorative, Anemone. Single flowers are in various shapes, sizes and colours and have very charming, pleasant and glandeur look.

Among the large–flowered a few important cultivars include Beauty, Snow Ball, Green Goddess, Premier (White); Chandrama, Super Giant, Evening Star (Yellow); Cover Girl, Fish-Tail, Pink Cloud, Shirley Perfection, Pink Turner (Mauve, Purple, Pink); Autumn Blaze, Alfred Simpsons, Appart, Distinction, The Dragon (red, Bronze apricot). Among small flowered, some notables are Honey Comb, Joyotsana, Sharad Shobha, Sharad Mala, Perfect (white); Archana, Aparajita, Exquisite, Sharad Singer, Topal (Yellow); Alison, Charm, Megani, Modella (mauve), Garnet, Gem, Jean, Flit (Red Salmon bronze); among small cut-flowers are *white flowers*; Birbal Sahni, Himani, Joytsna; *Yellow flowers*: Basanti, Freedom, Kundan, Sujata; *Mauve*: Apsara, Neelima, Gaity; *Red*: Blaze, Jaya, Dainty Maid, etc. Birbal Sahni, Carol, and Sharsol Shobha are white; whereas Basanti, Freedom, Hosur Yellow Kundan etc. are small flowered cultivars, suitable for garlands.

Ashoka - in flowers

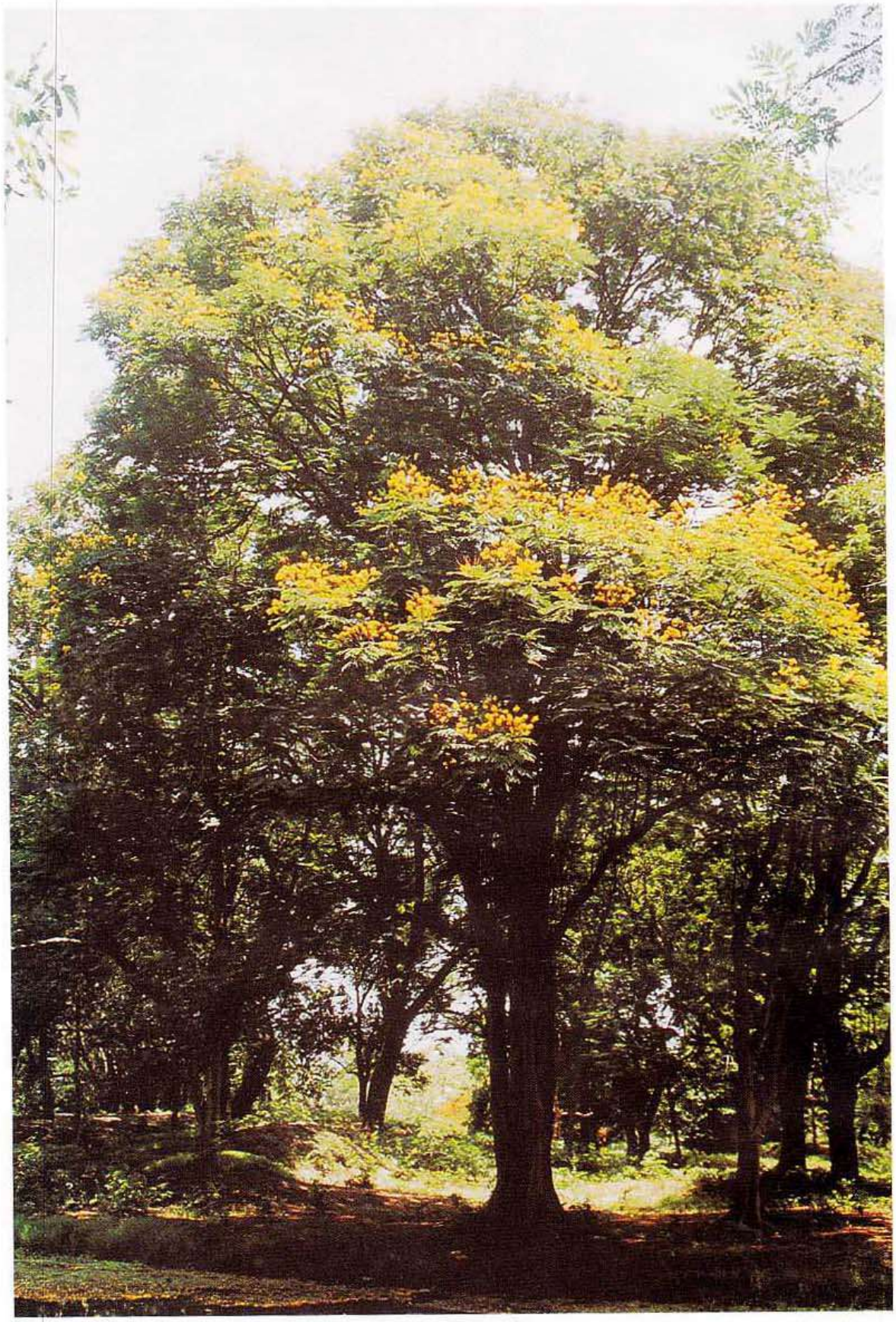
Ashoka - habit

Bottle Brush in flowers

Bottle Brush (Pollandii) - in flowers

Champak flower and fruits

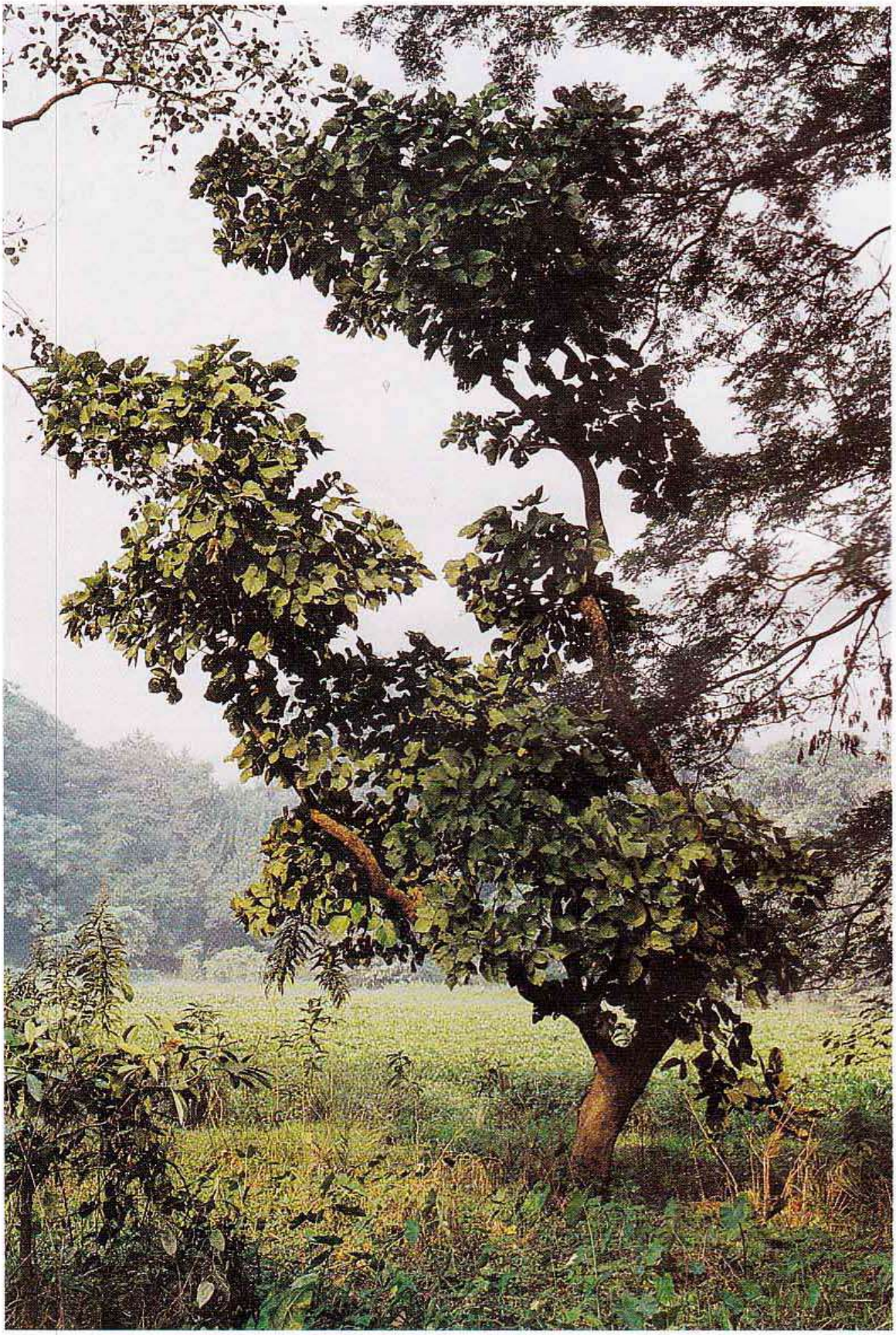
A Champak variety - Alba



Rusty Shield Bearer showing habit

Rusty Shield Bearer - in flowers

Rusty Shield Bearer - in fruits



Flame of the Forest - habit

Flame of the Forest - tree in full bloom

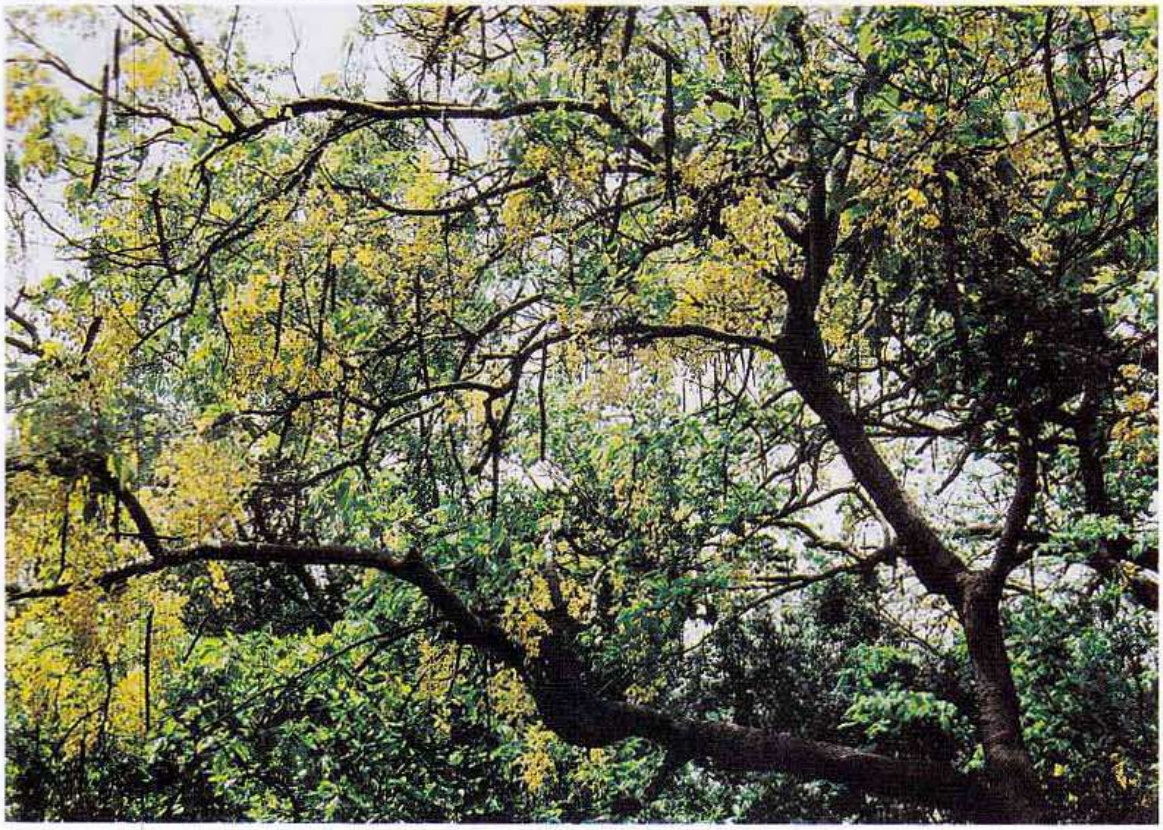
A flowering twig of Flame of the Forest

Fruits of Flame of the Forest

Gold Mohur - Tree in full bloom

Gold Mohur in Flowers

Amaltas or Indian Laburnum - tree with flowers and fruits



Indian Laburnum - in bloom

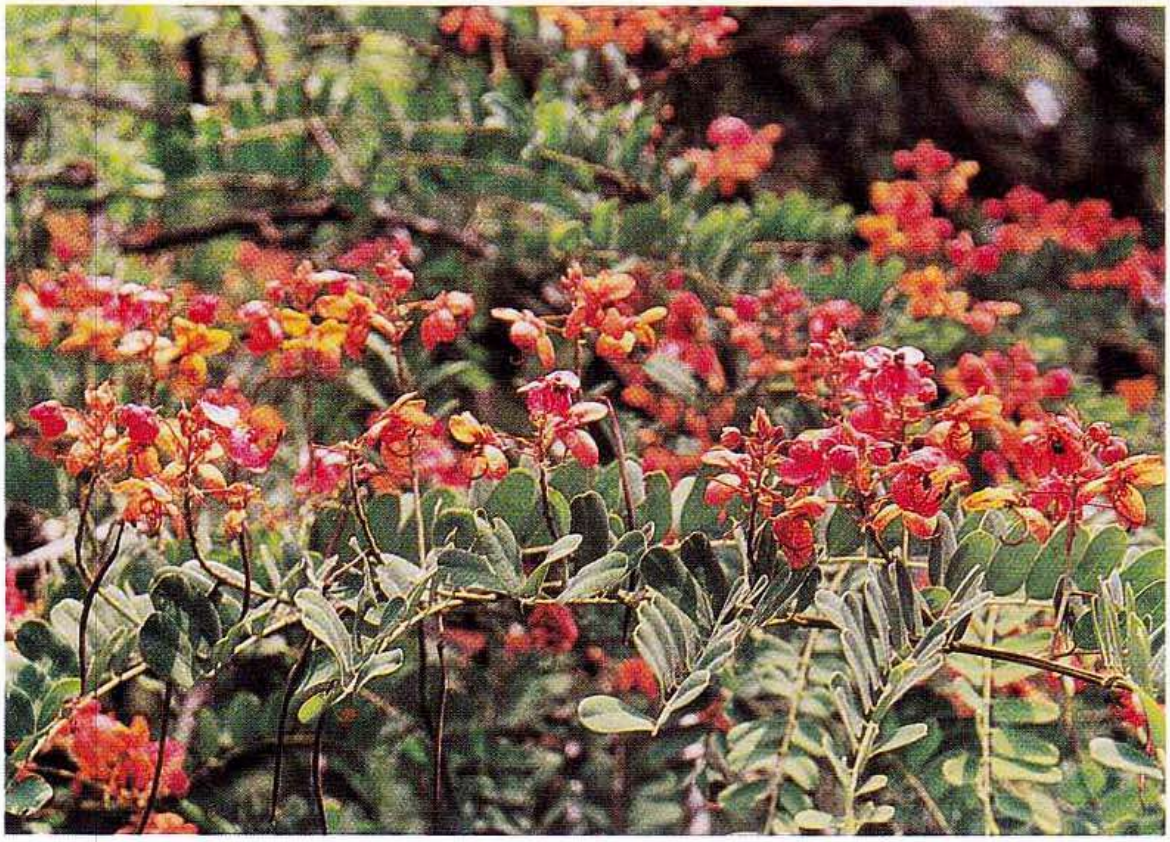
Ringworm Cassia - in flowers and fruits

Horse Cassia - in full bloom

Java Cassia - in full bloom

Burmese Pink Cassia - in flowers

Red Cassia - in flowers



Indian Coral tree in flowers

Cockspur Coral tree in flowers

Blakei Erythrina in flowers

Nag Keshar with flowers and fruit

White Frangipani - flowers

Temple or Pagoda tree - habit

Temple or Pagoda tree - variety *Rubra forma* 'Bicolor'

Frangipani *(Plumeria lutea)* showing habit

Frangipani (*Plumeria lutea*) - flowers

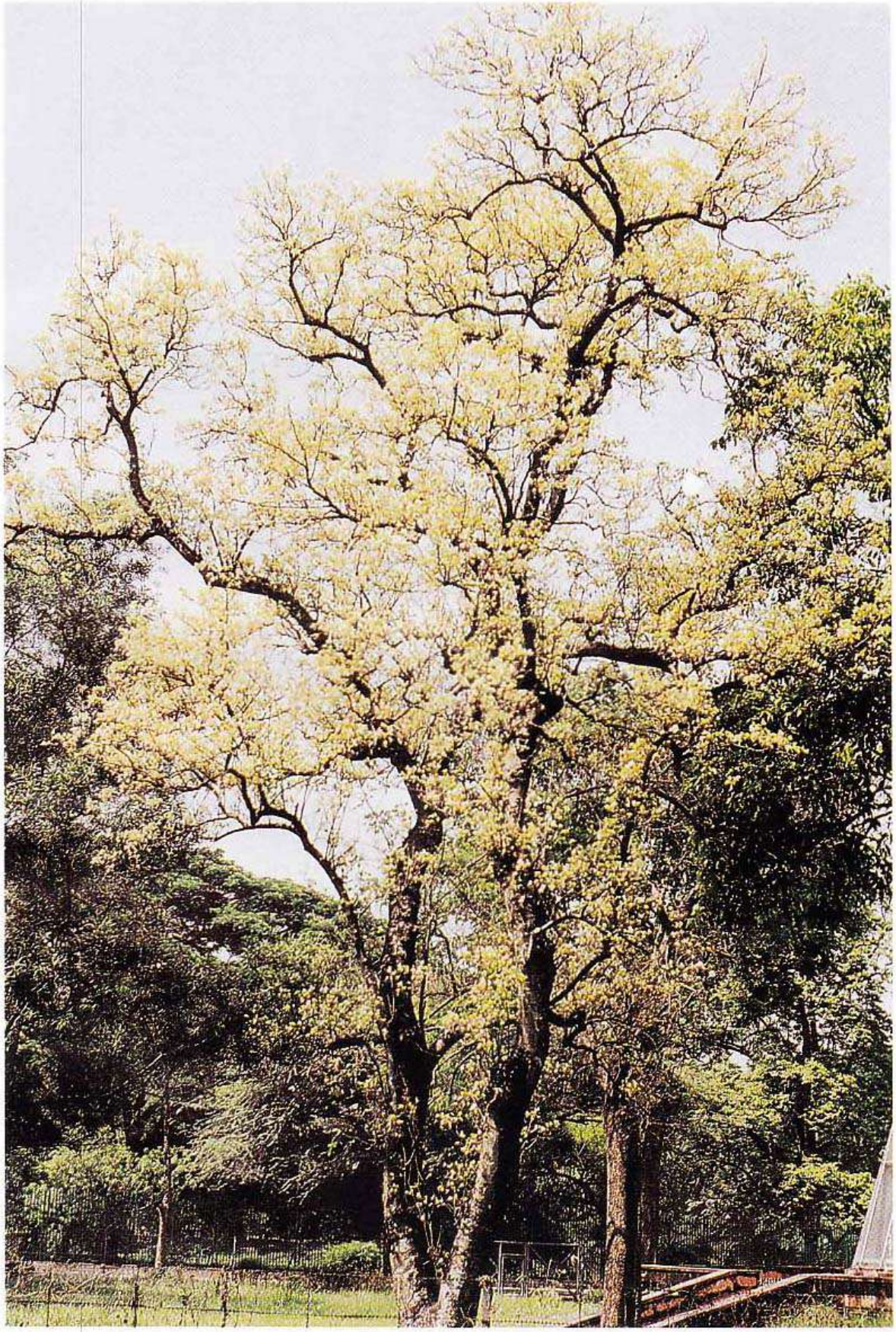
Frangipani *(Plumeria obtusa)* showing habit

Frangipani (*Plumeria obtusa*) showing flowers

Red Silk Cotton tree showing habit

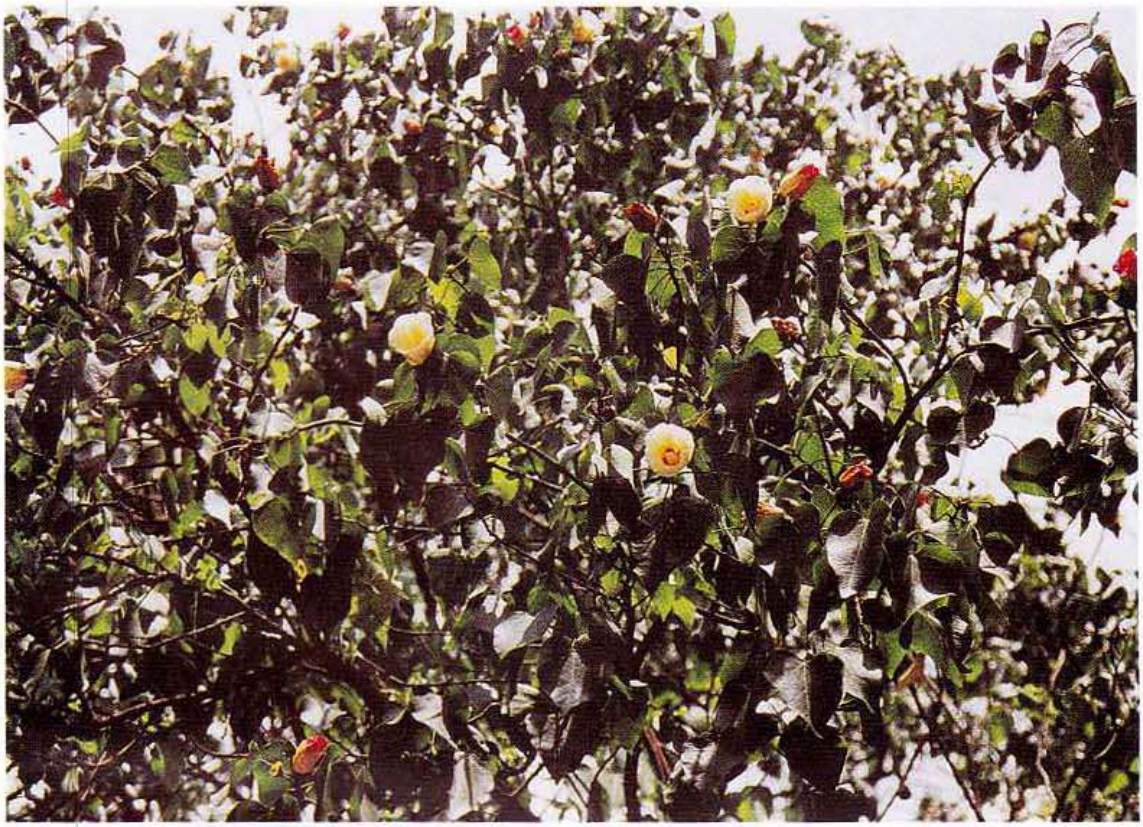
Red Silk Cotton tree - flowers

A fruiting twig of Red Silk Cotton tree



Sacred Barna - habit and in bloom

Sacred Barna in flowers

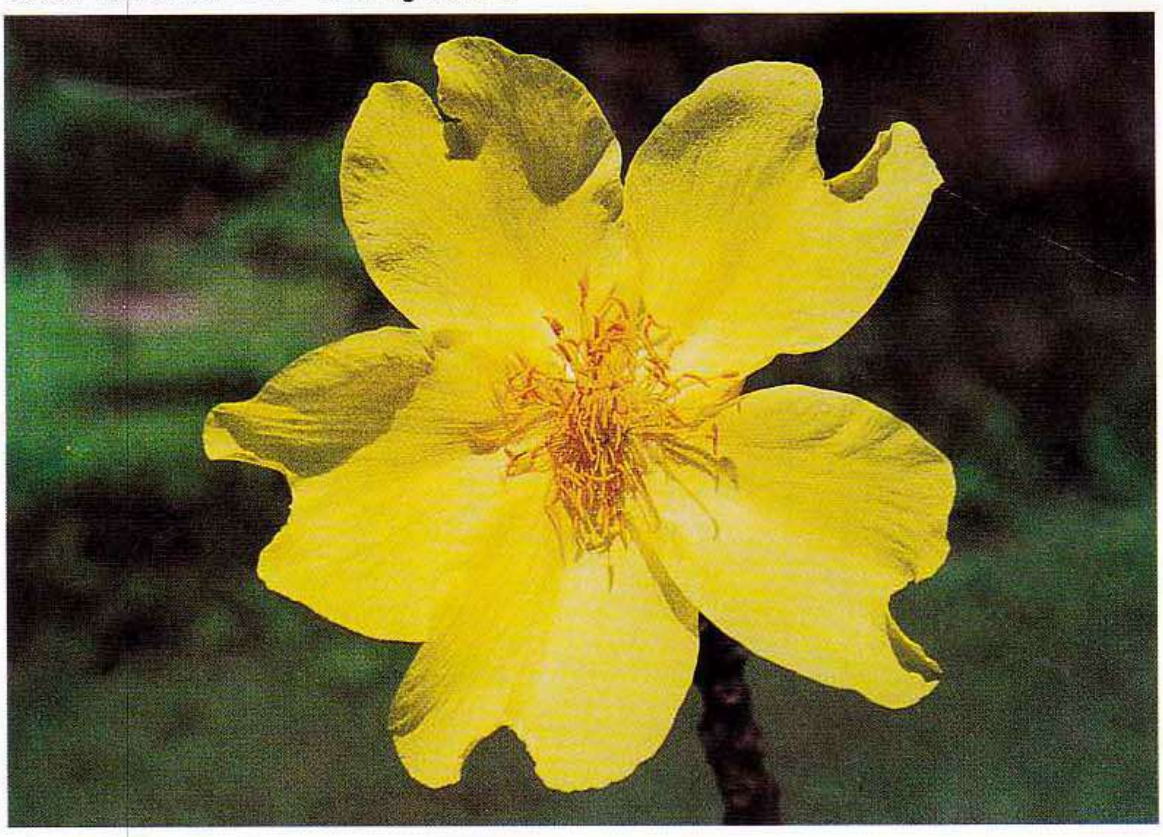


Umbrella tree - habit with flowers

Umbrella tree in flowers

Yellow Silk Cotton Tree - in full bloom

Yellow Silk Cotton Tree - showing a flower



Seeds are sown during March–May, germination takes place between 10-15 days and are transplanted during October–December. It is suited for bedding and as border plants and can be grown with less care.

Flowers during February–April.

Annual varieties are propagated through seeds whereas perennial ones are multiplied through suckers, cuttings and grafting. Cuttings are generally planted in clean sand during December–March, 8 cm apart; rooted cuttings are planted in pots, filled with a mixture of sand, leaf mould and garden soil in 2:1:1 ratio, respectively.

It requires sandy loam soil mixed with clay and well decayed cow-dung manure; it prefers full sunshine all the year round with protection in rainy season. Over watering is harmful to plants. These are grown in very specialised form; timely care benefits in its proper growth and to obtain requisite size and form of flowers.

Chrysanthemums are grown in ground, beds and in pots; the decorative large–flowered varieties are re-potted 4 times, filled with the recommended potting mixture containing soil, sand, leafmould and manure depending on their size and growth between February-September to get blooms in October-November. The small-flowered types are generally not repeated for transplanting. Proper drainage, staking, pinching of buds, manuring including liquid manure and foliar feeding mixed with chemical fertilizers in recommended ratio at different stages are done to get size and quality of blooms.

Plants are generally attacked by Aphids which can be controlled by spraying of soapy water mixed with tobacco decoction or Malathion and Parathion. Hairy caterpillars feeding on leaves can be controlled by hand collection and spraying with Thiodon 35 EC or Ecaulux 35 EC at 1.25 ml/1; Red spider mites damage the leaves and buds and are controlled by spraying any systemic insecticides viz. Metasystox and Kethane. Grub affects stem and roots and resulting plant gets wilted, and dry-Aldrin, Lindane or Thimet is applied in soil; and termites are checked by using 5-7 BHC (Gamexine) or neem cake. Root rot, caused by poor drainage and foot rot is checked by mixing Thiram in soil; stem rot and wilt can be controlled by mixing of Dithane M-45 in soil, leaf spot by foliar spray of Bavistin or Belate (Both 0.1%); Silver-leaf (black spot) by spraying of potassium permanganate; powdery mildew by spraying of Triforine (30 gm/100 l); Bacterial blight by using of disease free propagules and soil sterilization.

Cockscomb

One of the most attractive hardy annuals, grown for the showy, dense wavy 'comb' like monstrous floral heads, which are formed as a result of fasciation of the flowers, hence the name 'Cockscomb'.

It is named as Mayura-shikha in Sanskrit, locally called Lal murghka, Kokan, pilemurghka, Murgakesh (Hindi), Lal murga, Huldimurga (Bengali), Mayurshika (Marathi) Mora shikha (Gujarati) and Kodijuttuto-takura in Telugu.

Botanical name is *Celosia argentea* L. var. *cristata* Voss, and belongs to Amaranth family-Amaranthaceae. *Celosia* is derived from the Greek word 'kelos' meaning splendid "burnt blood spot", 'Keleos'-"burning" referring to the colour of the flowers, *argenteus* in Latin (argen-teys), mean silvery and *cristata* refers to crested flowers.

Herbs—45-90 cm tall, stems fleshy, sometimes fasciated. Leaves—green or bronze, linear-lanceolate to lanceolate-ovate. Spikes—terminal, dense, flattened or crested, sometimes fluted, velvety, crimson or red, purple, violet and yellow and 15-25 cm wide; seeds—small, black and shining.

Supposed to be native of India, planted in gardens in pots or in beds for its compact brightly-coloured, crested floral heads.

Variety 'Jewel Box Mixed' has a wide range of colours and very much suited for pot-cultivation.

Stems yield fibre and whole leafy-parts are consumed as pot-herb; flowers are used against diarrhoea and seeds in cough and dysentery.

Variety *plumosa*, called Prince of Wale's Feather', has silky feather-like or plumy floral heads in various colours–yellow, scarlet, red, gold, etc.; grows to 25 cm or even up to 1 m in height.

Tall varieties are suited for mixed borders, along walls, and dwarf varieties are suitable for pot cultivation and for general display. Golden feather, Jewel Box, Fire feather, Dwarf mixed, Fairy fountains are a few varieties met in cultivation.

'Cockscombs' and *plumosa* varieties flower mostly during hot months, but can be grown in all seasons and propagated through seeds; sown in January-February, May-June and September-October to get flowers in summer, rainy and winter seasons, respectively; seedlings are transplanted after 3 weeks, having 4-6 leaves and plants generally bloom in 3 months. It prefers light rich soil and can be grown with little attention, however, plants need regular watering to avoid wilting, and also for pot-cultivation; plants require frequent transplanting and for taller varieties stakes are provided. Dwarf varieties are recommended for pot-culture.

Common Snapdragon or Antirrhinum

Commonly known as Floral Snapdragon or Large Snapdragon; botanical name is *Antirrhinum majus* L., it belongs to Figwort family – Scrophulariaceae. The word *Antirrhinum* is derived from the Greek word 'anti'–like and 'rhis' or 'rhinos'– snout or nose referring to its shape of flowers and *majus* in Latin denotes its large sized flowers.

Plant is a native of South Europe, Syria and North Africa, introduced into horticulture in early 19th century and occupied its place in many parts of India, particularly in gardens, parks, residential buildings and by plant lovers for its excellent floral beauty, curious shape and varied colour, now most popular as winter annual, best suited for mixed borders in beds, pots, rock gardens, window gardens and also for cut flowers.

Herbs—perennial, half hardy, erect, 20–100 cm tall with 20-30 cm in dimension, but usually grown as annual. Leaves—opposite, lanceolate or oblong-lanceolate, entire, about 6 cm long, dark green, sometimes variegated. Flowers have many colours like white, yellow, pink and shades of velvety red appear in elongated, terminal spikes; calyx—5–parted with long corolla tube; petals—without spur, upper lip erect and 2–lobed, lower 3–lobed and spreading, throat usually closed by palate, but is forced to open by the bees for pollination, Fruit—a capsule, containing many small seeds.

Flowers during February to April and fruits from April to May.

0There are many horticultural varieties grouped as tall (80-120 cm), intermediate (55-75 cm), dwarf (25-50 cm) and miniature (15-20 cm), even in double forms with varied attractive colours which provide excellent beauty. The dwarf variety flowers profusely for longer periods and is suited for edging, whereas tall ones add much beauty to the garden and are good for cut flowers, for table decoration and bouquets.

Plants are raised through seeds, sown during September and October in plains and in February and March in hills in a seed-bed or earthern pots filled with porous soil and compost. Seedlings with 4-5 leaves are transplanted in beds of 25-30 cm spacing and flourish well in porous loam having sufficient organic matter and nutrients. Plants prefer sunny situations. Regular hoeing, watering is done and manured with cowdung manure or leaf mould, and requires more nitrogen; top dressing with fertilizers is done during its growth period to gain good colour and flowers.

Besides its floral beauty, plants are medicinally important. Leaves applied as poultices to cure tumours and ulcers. Infusion of plants is given as cardiotonic, sedative and to control hypertension.

Garden Balsam

Garden balsam is a popular indigenous flowering annual, found wild at lower mountainous regions, particularly tropical and subtropical India and also much grown in gardens, parks and by amateurs during summer and rainy seasons, mostly in beds as borders and in pots for its showy and odd-shaped single, semi-double or double-flowers of varying colours like white, pink, crimson, blue mauve and with many other shades.

It is called Dushpatrijati in Sanskrit, local names are Gulmendhi, Gulmehandi (Hindi), Dupati (Bengali), Haragaura (Oriya), Bantil, trual, holu, tatura, tilphar, juk (Punjabi), Gulmendhi, pantambol (Gujarati), kasittumbai (Tamil) and Mecchingom in Malayalam.

Scientifically named as *Impatiens balsamina* L., belongs to Balsam family–Balsaminaceae. *Impatiens*, in Latin 'Impa-tiens', 'entis' means sudden bursting of pods on slight pressure and hence also called 'Touch-me-not'.

Herbs—fleshy, annual, 30-75 cm tall. Stems—knotty, reddish; leaves—lanceolate, deeply serrate. Flowers—axillary on short stalks; sepals and petals—colourful, out of 3 sepals, one is with long spur; petals 5, 2 are united; fruit—a capsule, bursts on slight pressure, seeds are thrown rapidly and outer cover gets twisted.

However, plant is variable in habit, size, leaf, flower, shape of lip and length of spur.

Flowers during March-June (from seeds sown in January-February) and July-September (from seeds sown in May-June). Seeds are either sown directly in beds, followed with thinning and maintaining a distance of 30-45 cm for good growth and flowers or in nursery beds/pots and transplanted having 3-4 leaves. Seeds germinate quickly within 6-7 days, and seedlings get ready after 15 days after seed sowing. Plants are also propagated by cuttings.

Plants prefer sandy-porous moist soil having much humus, but need open, dry and sunny situations. It requires frequent watering in summer months, whereas good drainage

is essential in rainy days. Pinching of lower leaves and axillary branches and retaining of a few top healthy ones promote vigorous growth and enhances larger blooms.

Powdery mildew occurs when planted in total shade or soil with poor drainage, dusting with sulphur at fortnightly intervals is done as control measures.

Flowers are unsuitable as cut-flowers, mostly used on religious offerings to God; seed oil, suitable for cooking and used as illuminant; flowers and leaves are used as substitute for henna, a colouring matter.

Camellia-flowered variety possesses double forms and looks very handsome with many brilliant colours, whereas "Extra dwarf Tom Thumb type", produce various colours of flowers on top of foliage and are much suitable for pot and window boxes including for bedding.

Garden Poppy

It is popularly known as Corn poppy and Dutch poppy and is called Rakta posta (Sanskrit), Lalpost, post or posta (Hindi), Lalposhto (Bengali), Tambadakhasakhasa (Marathi), Lala, Lalkhaskhas (Gujarati), Erragas-sagassala, errapostakaya (Telugu), Sigguppuppostaka, sivappugashagasha (Tamil), kempu gasgase, kempukhasa-khasi (Kannada), Shivappupostakachedi and Chovanna-kashakasha in Malayalam.

Botanically called *Papaver rhoeas* L., this poppy belongs to family Papaveraceae. Papaver is a Latin name 'papaveris' of poppy and *rhoeas* is the classical name for the Corn poppy.

Herbs—annu-', *ca* 30-60 cm tall with milky latex. Leaves—variable, clustered at the base, hairy, pinnately divided. Flowers—red, purple to scarlet with deep dark eye; petals—orbicular, unequal in single whorls or double forms; stamens—many; stigma—disc-like. Fruit—a capsule, subglobose, smooth, seeds brown.

Flowers during winter months and remains in bloom for 8-10 weeks.

It is a native of Europe and Asia and found wild in Kashmir, also much planted in gardens/parks in beds and pots for magnificent bordering and display.

Plant requires porous, light sandy loam soil, mixed with farm yard manure or leaf mould; seeds are sown directly and thinned to *ca* 25-40 cm apart.

Among many varieties and strains, 'Shirley poppy'-having large flowers with more brilliant colour and shades and without any blotch at the base of petals, and variety 'Peony-flowered',–flowers double, looks like double peonies in different colour and shades, are commonly cultivated for their showy looks. Introduced into horticulture in 1886.

Medicinally, capsules are used in tonics and its latex is narcotic and sedative.

Opium poppy or white poppy (*Papaver somniferum* L.) locally called Afim, Post (Hindi), Pasto (Bengali), khus-khus, posta (Marathi and Gujarati), Abhini, gasalu (Telugu), gashagasha, postala (Tamil), Afim, khasakhasi (Kannada) and Afim, kashakhasa in Malayalam; mostly grown to extract milky juice, from which opium is obtained, is also under cultivation in different parts of the country with the permission of the District Opium Officers, Department of Excise of different states. Opium and seeds (Posto), considered to be highly narcotic, sedative, given for relief from pain, to check diarrhoea, dysentery and stomach disorders; white flowers even look ornamental when in full bloom.

Its native home is unknown, but found in all the Mediterranean countries and the Middle East. Introduced in the Indian Botanic Garden, Howrah before 1794.

Hollyhock

A very popular winter annual, it is grown in almost all gardens and parks of India for its varied colour and trumpet-shaped flowers.

Botanically called *Althaea rosea* L., Hollylock belongs to Mallow family-Malvaceae. *Althaea*, is a Greek word 'althos' or 'althiamo' means to cure or to heal, and 'Althia' is the Greek name for wild or marsh mallows and *rosea* denotes its rosy colour of flowers.

The plant is a native of China or Asia Minor, introduced as horticultural plant in the late 16th century and later spread to other countries. But first introduced in the Indian Botanic Garden, Howrah only after 1845 and subsequently distributed to other Indian gardens, now much cultivated for its majestic flowers, which appear on long spikes.

Herbs—perennial in hills and biennial in plains, but treated as annual; hairy up to 2.5 m tall and spreading to 60-120 cm area; leaves—large, rough, round, heart-shaped, wavy-angled or with 5-7 lobes; flowers—large, subsessile, in leaf axils, 6-12 cm across with 6-9 bracts below the calyx; corolla with varied colour of white, rose, red, pink, deep purple, mauve, either single or semi-double or double in form; fruit—a capsule with many, kidney–shaped, flat, black seeds.

Flowering from February to May in plains, but mostly throughout the year in hills, and fruits during March to June.

Plants require sunny situation, porous and well drained soil with enough organic matter for its luxuriant growth and good blooms. Plants are generally raised by sowing seeds directly in the beds, where it is desired to be grown (*in-situ*) at a distance of 50-60 cm in plains during September to October and in hills during February to March. However, transplanting of seedlings is also done but plants grow poorly than in direct sowing; seeds germinate within one week and become ready for transplanting in about 2 weeks. Plants do not grow in areas susceptible to strong winds and hence require proper stakes for support.

Hollyhock is very much suited to grow in the back row of herbaceous borders or as a border plant or along walls or planted in a group to get a better view. Flowers are unsuitable as cut flowers due to its short duration of freshness after opening.

Dye obtained from flowers is used as indicator for acid and alkaline tests and flowers are used to cure chest complaints.

Marigold

Marigold is one of the most common among the seasonal flowers. Its flowers have

a heavy demand for religious and social functions. It presents a beautiful look because of its dissected leaves and bright blooms.

It is botanically called *Tagetes*, and comes under family–Asteraceae. *Tagetes*, comes after 'Tages', an Etruscan deity, a grandson of Jupiter.

Out of about 30 species, mostly native of Mexico to Argentina, only 5 species are cultivated in India of which African Marigold and French Marigold are most common and probably first introduced in the Indian Botanic Garden, Howrah before 1794.

African Marigold is also popularly called, Big or Azetec Marigold (*Tagetes erecta* L.), locally known as Sthulapushpa, sonda, gandaga in Sanskrit, Genda, gultera (Hindi), Genda (Bengali), Gendy (Oriya), Guljharo, Makhanala (Gujarati), Zendu (Marathi), Bantichettu (Telugu), Tulukkasamandi (Tamil), Seccmashamantige chandumallige (Kannada), Chendumalli (Malayalam), Gul-jafari, makhmal (Bombay) and Tangla, mentok and genda in Punjabi.

Annuals—half hardy, erect, 60-70 cm tall. Leaves—pinnately dissected; segments 1-5 cm long. Flowers—solitary, 5-10 cm across, outer involucral bracts united and form a cup-like shape, on stout peduncles, swollen just below the head; rays—many, long-clawed, sometimes 3-lipped or quilled, yellow, lemon yellow, golden yellow, orange, pale yellow or white. Achenes 6-7 mm long with scaly pappus.

Though called African Marigold it is of Mexican origin.

F1 hybrids are more praiseworthy than common varieties, which produce masses of bloom in different shades of colour, form and size; inclue yellow climax, Golden climax, Orange climax, Golden Jubilee, Diamond jubilee, Moon shot, Apollo, Fire lady, Gold lady, Orange lady; among compact flower varieties are: Golden age, Spun gold, Dwarf cupid mixed and in standard varieties: Chrysanthemum-Flowered Mixed, Super Jack Orange and Crackerjack mixed, etc.

Plants sometime get affected with bacterial blight, causing severe discolouration due to lesions on the leaves resulting in defoliation; dusting with sulphur is beneficial.

It yields from 10-18 tonne of flowers per ha depending on its cultivation practices and varieties.

Flowers are much used for religious ceremonies and garlands. Medicinally, plants are used against rheumatic pain, cold and bronchitis; roots are given as laxative, in kidney troubles and muscular pain; leaf juice given to cure earache and florets are given in the treatment of eye diseases and in ulcer.

French Marigold (*Tagetes patula* L.), is called Taugla in Sanskrit, Genda (Hindi & Bengali), Gendu (Oriya), Machamul, Guljaphini (Bombay), Tulukmalli cheddi in Tamil.

Bushy, small, annual, strongly scented, 30-45 cm tall. Leaves—pinnately dissected, 5-10 cm long; segments 1-3 long, linear-lanceolate, serrate. Flowers—in solitary heads 3-4 cm across, single or double, comparatively smaller (than African Marigold), yellow, golden, rusty red, mahogany, orange-deep scarlet and often blotched or striped or spotted in different colours.

Its native home is also Mexico, but is commonly cultivated throughout, in gardens as herbaceous border, suited for edging, window boxes and in rockery and near temples and also cultivated commercially near big cities and towns to meet its floral demand and even met as an escape from cultivation. Its yield varies from 8-12 tonnes of flowers per ha depending on cultivation, variety and manurial treatment.

Common Dwarf, double varieties are: Yellow crown (Spry), Tangerine, Golden ball, Harvest moon, Honey comb (crested), Honey moon (crested); among extra dwarf double:

Petite-yellow, Petite gold and Petite orange, whereas Cinnabar (new), Susanna (new), Lemon king are important among dwarf with single flowers.

Flowers are used for general decoration, social functions and religious offerings as cut flowers and garlands, and yield *attar*, called *attar Genda*, a well known perfume. Roots and seeds are considered purgative; flower decoction is given as carminative and juice of floral heads is used as antiseptic and applied on cuts and wounds.

Marigold generally flowers from December-June but stray flowers are seen throughout the year; raised from seeds sown during August-September and in hills during March-April. Sometimes, propagation is done by cuttings through young shoots by planting in friable moist soil.

Marigolds are successfully grown in any soils, but well manured, friable sandy loam is preferable. 4-6 weeks old seedlings with 3-4 leaves are transplanted in well worked soils, spaced about 40 × 30 cm for African Marigold and 20 × 15 cm for French Marigold. 40 kg nitrogen and 200 kg phosphorous per ha gives maximum growth and flowers. Plants need regular watering preferably after 5-7 days.

Plants are attacked by Red Spider Mite which can be controlled by spraying of Kelthane; Hairy Catterpillar by spraying of Thiodan, 1 ml in 1 litre of water; leaf hopper by spraying of Malathion; slugs by dusting with Metalodehyde are some suggestive control measures. Plants get affected with color rot, leaf-spot, leaf-blight and powdery mildews, which are controlled with spraying of fungicides.

Sun Flower

It is also called Common Sun Flower, Surya–Mukhi in Sanskrit, Sooraj Mukhee (Hindi, Bengali and Gujarati), Suryaphul, Surajamukha (Marathi), Aditya–bhaktichettu (Telugu), Suryakanti in Kannada, Malayalam and Tamil.

Botanically called *Helianthus annuus* L., belongs to Aster or Composite family Asteraceae or Compositae. *Helianthus*, derived from the Greek word 'Helian–thus', 'Helios', the sun and anthos, a flower, meaning flower similar to Sun and *annuus* means annual.

A north American plant, well placed in Indian gardens for its showy flowers and even the seeds are commercially utilised for edible oil.

Hardy, hairy annuals with stout, straight stems, 60 cm to 3 m tall and up to 90 cm spread. Leaves—alternate and triangular–ovate, acute or acuminate rough and hairy, toothed about 30 cm long. Flower heads—similar to a disc and sunlike, 10 to 50 cm across, brownish–purple, tubular rays yellow with blackish bracts, the ray florets orange yellow.

Flowers during October–March. Propagated through seeds, by sowing seeds in open ground at a distance of about 30 cm, 2–3 seeds are sown at one place, about 1.5 cm deep and are thinned–out after germination, maintaining 60 cm and 30 cm spacing for tall and dwarf varieties respectively.

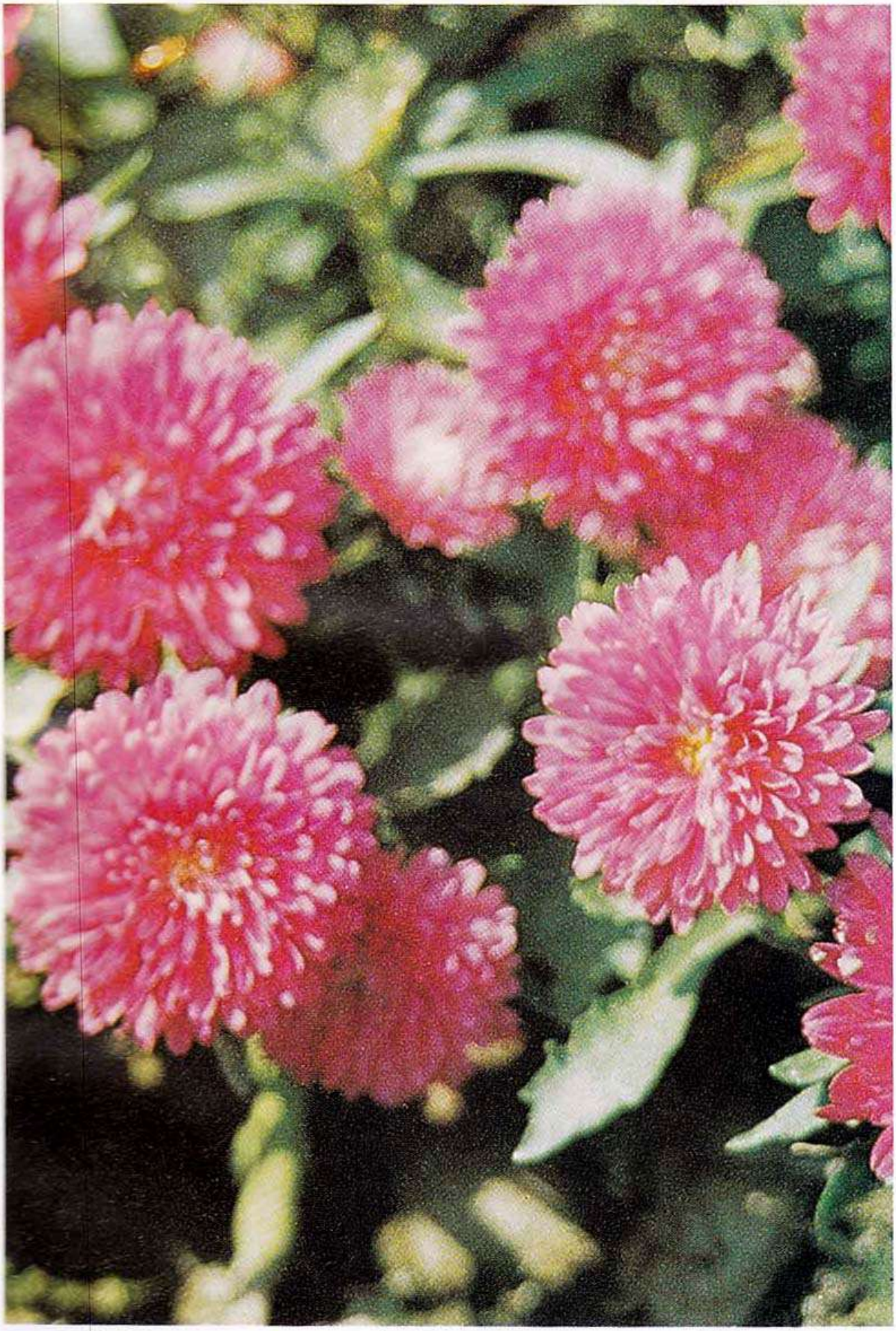
Many hybrids, with different colour and shades, particularly yellow, red or orange, usually with large black centre, even in double forms have been evolved; important ones are: 'Sunburst'– about 120 cm tall, well branched with wiry–stems; flowers pale primrose

through bronze to maroon coloured, well suited for cut flowers. 'Giant yellow'–large sized flowers with single heads, colours range from creamy white and yellow through bronzy rose to ruby and maroon; nearly 2 m tall, 'Sungold' – dwarf varieties with double, bright yellow flowers.

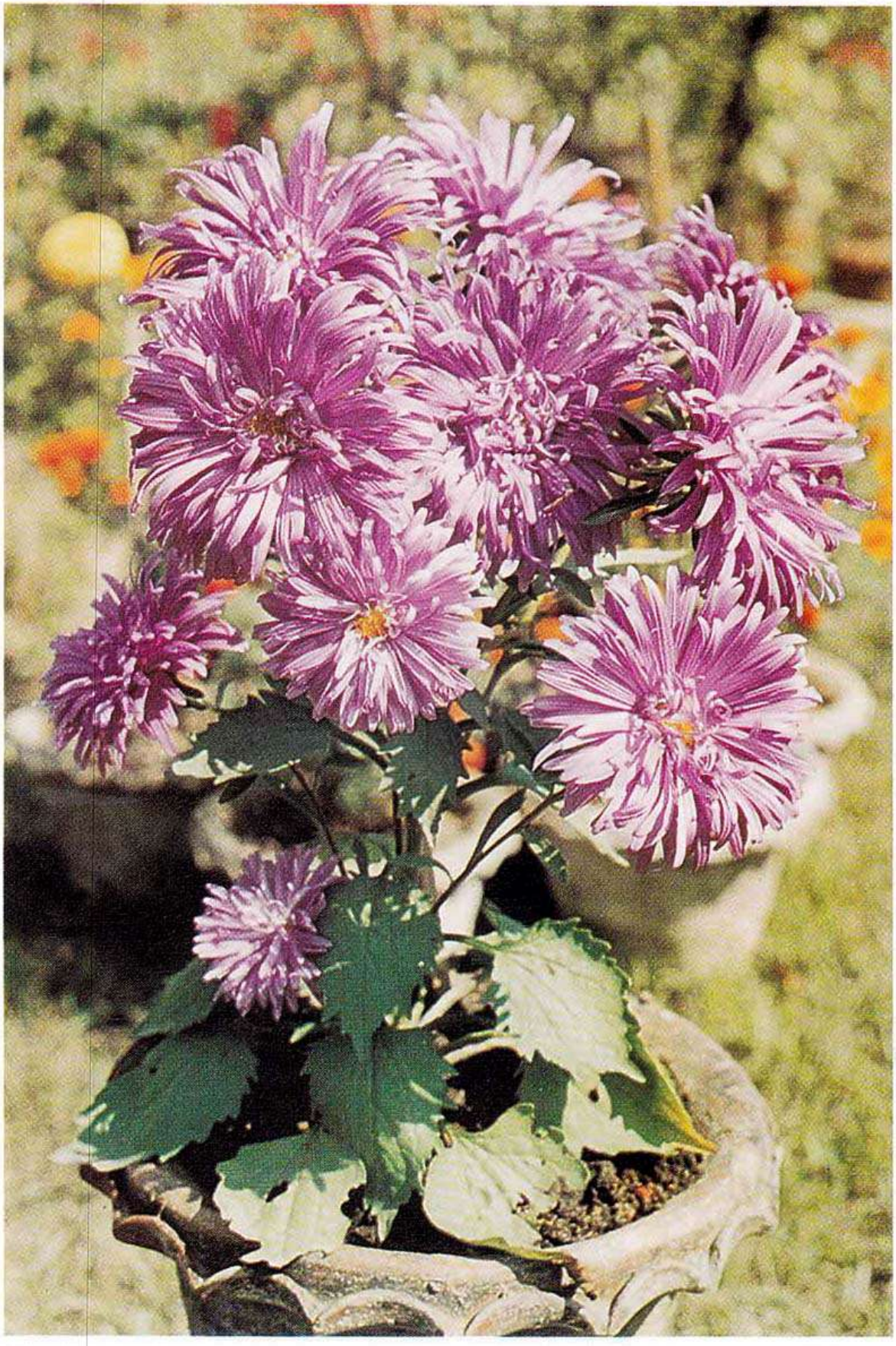
Helianthus annuus variety *'Dwarf Sunburst'* have smaller leaves and flowers are best suited for beds.

Requires no proper care and treatment after sowing except proper spacing and watering at regular intervals.

Planted in beds as seasonal flowers, suited for cut flowers; edible oil is extracted from seeds and cake used as birdfeed.



China Aster in flowers



China Aster-habit and in flowers

Chrysanthemum Annual in flowers

Chrysanthemum incurved type (hybrid) in flowers

Chrysanthemum Decorative type (hybrid) in flowers

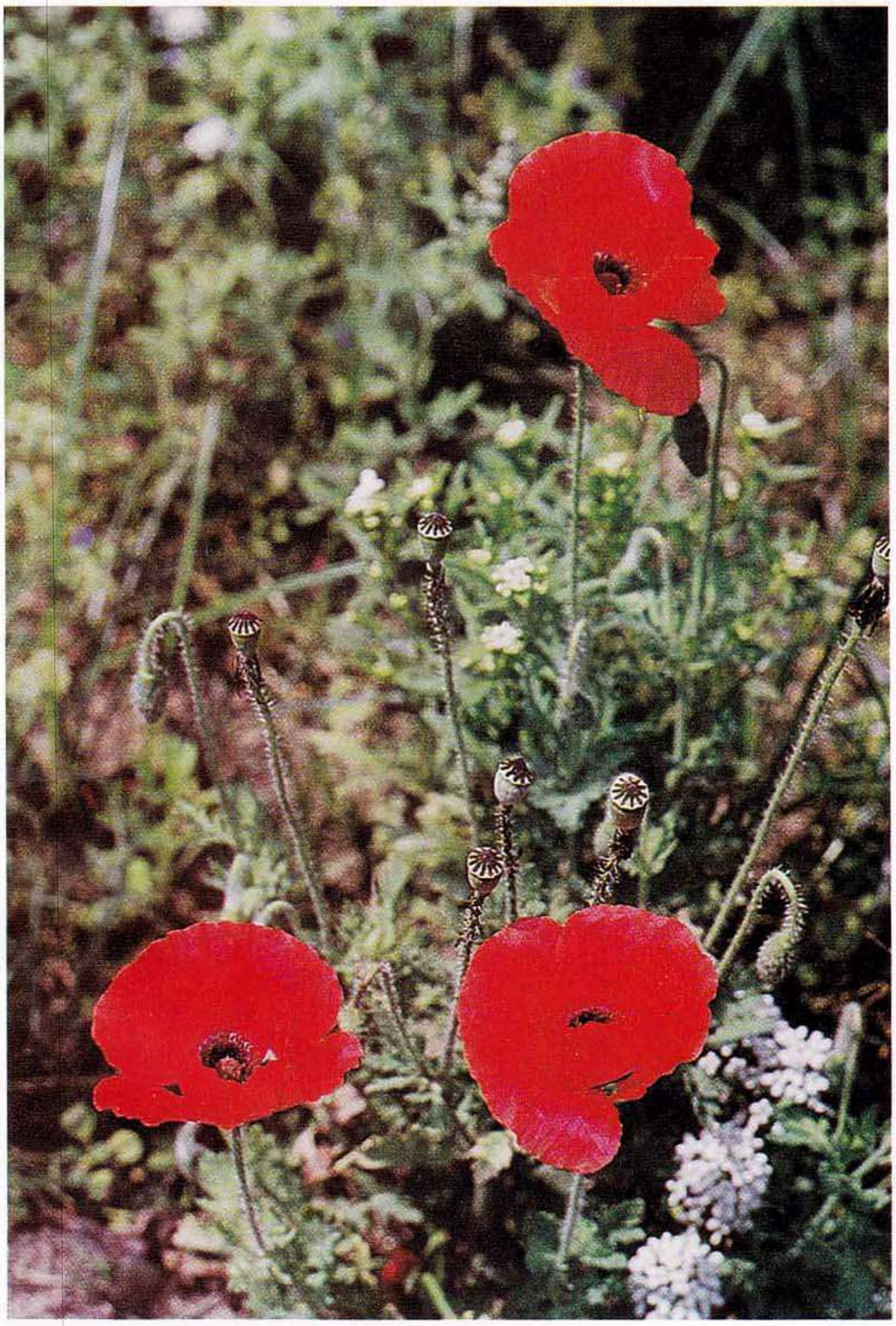
Cockscomb- variety 'Jewel Box' Mixed

Cockscomb-variety *plumosa*

Common Snapdragon or Antirrhinum

Garden Balsam in flowers

Balsam (Hybrid) in flowers



Garden Poppy in flowers

Opium Poppy in flowers

Hollyhock in flowers with varied colours

African Marigold - varieties in flowers

African Marigold - Dwart variety in flowers

French Marigold in flowers

French Marigold - Dwarf variety, habit and in flowers

Sunflower - variety 'Giant Yellow'

Sunflower - variety 'Dwarf Sunburst'

CLIMBERS

Golden Trumpet or Allamanda Flower

Allamanda or Golden trumpet is also called Kampanilya; and in Indian languages is called Harkakra (Bengali), Kalamba (Malayalam), Allemandathega (Telugu), Allamandagide, Haladilu (Kannada), Jahari, Sontakka, Pivilikaner (Marathi) and Konangani (Konkan).

Scientifically named *Allamanda cathartica* L., belongs to Dogbane family – Apocynaceae.

The *Allamanda*, named in honour of Dr. Fr. Allamand, Professor of Natural History, in the last part of 18th century in Leyden and *cathartica* has been named from the Latin word *'Cathartius'* – meaning for its medicinal properties – used for free flow of urination.

It is a native of Brazil, first introduced in Indian Botanical Garden from Guinea in the year 1803 by W. Hamilton and later distributed to other parts of India in gardens, parks and residential places for its handsome foliage and particularly for large, funnel-shaped, golden-yellow flowers, which present splendid beauty.

Shrubs—robust, straggling, evergreen, having smooth and glabrous branches. Leaves—up to 12 cm long, wax-like, smooth, opposite, in whorls of 3 or 4, obovate, oblanceolate, tapering at both ends, very-short petioled, glabrous except on the veins beneath. Flowers—large, funnel-shaped, bright yellow or golden, with dark throat, striped, appear in terminal, cymose, panicles and later axillary; corolla lobes—4–8 cm across. Stamens—5, jointed. Fruit a capsule, globose with soft prickles, having many flat, winged seeds. Fruits are rarely seen.

Flowering during July to December.

Plant is propagated easily through stem cuttings and layers.

Due to its hardy nature, it can be grown in any soil and requires pruning after flowering; application of cowdung manure and regular water enhances its growth and flowering. It is well suited on arches, pergolas, trellies, shrubbery, as specimen on lawn and also on frontage of buildings. *'Williamsii'*, variety, with double flowers has also been introduced in a few gardens. A number of varieties having difference in morphological characters, particularly in flowers are seen in gardens. Two important varieties of *Allamanda* are stated hereunder:

Golden Trumpet bush (*Allamanda neriifolia* Hook.) – nearly erect, evergreen shrubs with terete stems, woody below, smooth and glabrous, young plant bears minute hairs. Leaves—in whorls of 2–5, elliptic or ovate, acuminate, dark green. Flowers—large, showy, light yellow on terminal panicles. Corolla tube—5 cm long with swollen base, lobes 5, orbicular, or oval, spreading corolla tube inside streaked with reddish-brown or orange red.

Flowers during July to November. Plants are propagated through stem cuttings and layers.

Plant is native of Brazil; generally planted in gardens as a pot plant, shrubbery, but most suited for trellies, pillars, arches, pergolas, etc. A mixture of loam and humus is advisable to be given, followed with regular watering during February–March for good growth and for its numerous, magnificant flowers.

A horticultural variety with variegated leaves, 'variegata' is also being cultivated by plant lovers.

Purple Allamanda (*Allamanda violacea* Gardn. & Field.) – Erect shrubs with about 2 m height and terete branches, hairy in young stage. Leaves—ovate, rough, hairy, 8–10 cm long, in whorls. Flowers—in terminal cymes, large, violet purple to red–purple; corolla–tube—up to 6 cm long, narrow and constricted in the middle, upper part purple–red, middle part greenish–yellow and lower part reddish–brown, limb spreading 4–6 cm across, lower tube narrow and the upper campanulate, ending above in 5 orbicular, broadly ovate lobes.

Flowers during April to December, propagation is done through stem cuttings, but grows well when grafted on Golden trumpet.

Plants require good drainage and sunny situations for good growth and flowers.

Roots are given to clear free urination and in malignant fevers.

Aparajita or Butterfly Pea

The title Butterfly-Pea means, flowers resembling a butterfly. It is also known as Mussel-shell-Climber; Aparajit (Hindi & Bengali), Gokurna (Marathi), Kakkanam or kakkatam (Tamil).

Scientifically named *Clitoria ternatea* L. of Pea or Pulse family-Fabaceae. *Clitoria* is an old name of no significance and *ternatea* named on one island of Ternate in the Muluccas.

Common throughout India and cultivated in gardens by private growers for its flowers and also found on hedges. The flowers are considered to be religious to the Hindus and offered to the Goddess 'Kali' and also associated with the planet Saturn ('Sani') from astrological point of view.

Climbers, pretty, perennial, with twining pubescent stems. Leaves—alternate, pinnately compound with 5-7 oval or oblong leaflets, having middle terminal one bigger in size. Flowers—bright blue or mauve having orange or white colour markings on the centre of the throat, similar in appearance to pea flower, size of about 5 cm, pods—about 5-10 cm long and beaked at the terminal end and almost flat with a few hairs, abundant and contain 6-10 black or brownish blotched seeds.

Flowers in double forms with blue or mauve colour and single and double flowers with white colour are also found; however, double flowers with blue colour are slightly bigger in size and look more attractive. Flowers almost throughout the year but profuse during July to November and fruits during September to January.

Plants suited to grow in any fertile soil but should have proper drainage, water-logged area is unsuitable for its growth and flowering. Generally plants are raised through seeds, sown before onset of rains and plants appear within a short time. Proper supports are

to be given at initial stages for its proper growth. Flowers start appearing within 3 months and open after sunrise. Sometimes insects attack its pod and seeds, which may be controlled by spraying insecticides.

Plant parts are also considered to be of medicinal value; its roots used as cathartic (clear urination); roots and seeds are laxative and flowers and seeds yield blue dye.

Tree Clitoria or Tree butterfly Pea (*Clitoria fairchildiana* Howard) flowers similar to butterfly pea, but curious due to its tree habit, is found in Indian Botanic Garden, Howrah, whose native home is North America. An evergreen tree with spreading branches, which form well-shaped crown. Leaves—leathery and thick, elliptic with 3-leaflets. Flowers—have thick petals, standard has shades of violet with deep centre and red margins. Flowers appear in July to September, which look attractive among heavy foliage and fruits—from September to January. Propagated by seeds, by cuttings and air layerings.

Clock Vine

It is called *Thunbergia*, named in honour of Carl Peter Thunberg (1743-1828) of Sweden, a student of Linnaeus, who travelled in Japan and South Africa. It belongs to family Thunbergiaceae (formerly under Acanthaceae). Out of about 8 species mostly found in India *Thunbergia grandiflora* Roxb, is most common and indigenous to Eastern Bengal, Bihar, Assam and Manipur. It is also commonly grown in gardens in the plains, particularly on pergolas, on trees and walls for its thick foliage and large, bell-shaped, pendulous flowers.

Grandiflora means large flowers in Latin, is locally called Mulluta (Hindi), Nul-lata (Bengali), Kukualoti (Assamese) and Kanesi in Punjabi.

Climbers—hardy, extensive, large and woody, evergreen; stems—4-angled or ribbed; leaves—opposite, broadly ovate, angularly cordate, toothed or lobed, rough and 7-nerved, about 10.0 × 7.0 cm, on the swollen nodes. Flowers—bright blue or white in pendulous racemes, with two velvety rims; corolla—large, tube short, 6.0 cm long, conical at the base ending with 5-lobes, 7.0 × 7.5 cm across, light or dark blue or white, generally whitish in the lower half shading into the blue lobes, yellow inside with blue strips in the throat. Fruit—a capsule, like bird's head; sets generally in cooler regions.

Flowers during March-November.

It is large and vigorous in growth, requires very strong support; dried branches and flowered twigs are to be pruned off to maintain shape, growth and to get good flowers.

Medicinally, decoction of leaves is given in stomach-ache, and leaves are used as a poultice.

Bush-Clock-Vine (*Thunbergia erecta* (Benth.) T. Anders.), a native of West Tropical Africa, introduced in India from Kew in 1859, is also being much cultivated in gardens throughout India as good compact hedge, shrubberies for showy flowers and also in a topiary form. *Erecta* in Latin means 'upright', referring to its erect habit.

Shrubs—erect, much branched, deciduous, glabrous up to 1.5 cm tall; leaves—opposite, simple, oval, short petioled, acute, margins entire or toothed in middle. Flowers—solitary or in pairs, axillary, pedicelled; corolla limb—blue-purple up to 3.0 cm long, tube

curved, yellowish-white; calyx—short and having 10 teeth. Fruit—a capsule, generally not seen in the plains.

Flowers from October-January, however, stray flowers are seen throughout the year. Easily propagated through stem cuttings during rainy season. It grows well in well manured soil, grows and flowers luxuriantly in bright sunshine and also in semi-shaded situations.

Variety *erecta "alba"* has white flowers, but it is not common as the former one.

Morning Glory

Botanically called *Ipomoea*, which seems to be derived from two Greek words 'ipos', meaning bindweed or a kind of beetle that eats vines and 'homois' means like or similar to, the trailing habit or convolvulus, belongs to Potato family – Convolvulaceae.

Members of this group are mostly herbaceous twiners, rarely shrubby scramblers; leaves—simple, attenuate; flowers—salver-bell or funnel-shaped, large and showy with many colours like red, blue, yellow or purple, appear single or in clusters. More than 400 species of *Ipomoea* are reported to occur in India. Many have got its place in Indian gardens and parks for their elegant, eye catching beautiful flowers; among these the RAILWAY CREEPER is most common, being planted for its divided leaves and showy flowers, usually to cover trellies, arches and corridors, much planted at railway stations hence the common name. It is indigenous to India and found naturalised in most of the tropical countries.

Botanically named *Ipomoea cairica* (L.) Sweet or *Ipomoea palmata* Forsk. The name *cairica*, presumed to be given from place Cairo, as the plant was early named after Egypt and *palmata* in Latin meaning hand-shaped leaves. It is locally called Monvel in Marathi.

Shrubs (twiners)—perennial, climbing; stems—glabrous; leaves—2.5-4.5 × 2.5-4.5 cm across, palmately cut into 5-7 elliptic or lanceolate, oblanceolate or ovate lobes. Flowers—appear on very short peduncles, one or few, axillary, often with 3-flowered cyme, 5-6 cm × 7 cm across, corolla—campanulate, purple or mauve with deep throat, slightly 5-lobed with clear and prominent plaits; fruits—egg-shaped, 1 cm in diameter with 4 or less seeds covered with silky hairs.

Flowers almost throughout the year, but profuse during July to October. Propagated through stem cuttings. Dried and old flowered branches required to be removed for new growth and flowers.

Other Ipomoeas grown and found for showy and common flowers are:

Ipomoea carnea Jacq.–straggling shrubs; flowers—large, rose or light mauve. Indigenous to South America.

The Star Ipomoea (*Ipomoea coccinea* L. or *Quamoclit coccinea* Moench.) – weak twiners; leaves—ovate or cordate; flowers crimson, orange or yellow. A native of Mexico and North Arizona.

Ipomoea lobata Thell. – Annual, small creepers; leaves—heart-shaped (cordate), 3–lobed, the middle lobe longest and narrowed below. Flowers—rich crimson or orange, salver shaped and tubular below. Native of Mexico.

The Common Morning glory (*Ipomoea purpurea* (L.) Roth) – Annual, hairy climbers; leaves—ovate–cordate, sharply acuminate. Flowers—funnel–shaped, white to pale-blue or purple. Native of Tropical America.

Morning Glory (*Ipomoea rubra–caerulea* Hook.) – Creepers; leaves—cordate; flowers—red and sky blue.

The Cypress Vine or Indian Pink (*Ipomoea quamoclit* L.) – Annual twiners, leaves—pinnately divided with scarlet flowers. Native to Mexico.

SHRUBS

Barleria

Named in honour of Jacques Barrelier (1606-1673), a French Botanist, Barleria is characterised with large, often spinose bracts, subequal; calyx—4 parted, outer pair of lobe more or less bifid, large, the interior ones small and narrow; corolla lobe—5, spreading broad, mostly subequal; stamens—4 and didynomous, attached to near base of corolla having white, blue, pink, red, violet, purple or yellow colours and mostly found in the Old World Tropics. It belongs to botanical family-Acanthaceae.

Among more than 100 species, Phillippine Violet – *Barleria cristata* L. Jati in Bengali, is indigenous and most common and found throughout in deciduous forests up to 1000 m in plains and also grown in gardens. *Cristata* in Latin means crest.

Undershrubs—0.75-1.5 m tall, much branched, hairy; stems—angular, hairy and green. Leaves—opposite, variable, ovate or lanceolate or linear-oblong, hairy, tapering to short petiole, short acute, green above and pale beneath up to 10 cm long and 4 cm broad. Calyx lobes—spinous-ciliate, ovatelanceolate, hairy, nerves prominent, reticulate, light green or whitish with long, spiny teeth; flowers—blue or sometimes white, sessile, axillary, solitary or in terminal spikes about 5 cm long; tube—cylindric below, then funnel-shaped; lobes—ovate 2.5-5 cm broad; stamens—4 and in two lengths, attached to near base of corolla. Fruit—an ovoid capsule with about 4 small seeds.

Flowers during October-November and March-April and fruits in March-April.

Generally grown in gardens as protective hedge, in shrubbery and when in full bloom, enhances beauty of the plants for short periods. Plants can be grown by seeds and by soft wood cuttings during rainy season; it prefers any soil, clear sun as well as suited to semi-shaded situations. It requires to be pruned for good growth and blooms.

Leaves and roots are given to cure cough and to reduce inflammations and also against snake bite. *cristata 'candida'* (white), *cristata 'hybrida'* (lilac), *cristata 'dichotoma'* (pink); *cristata 'rosea'* (rosy) and *cristata 'lancastari'* with purple flowers are horticultural varieties in cultivation.

Cape Jasmine

Commonly called Gardenia, Cape Jasmine is locally known as Gandhraj (Hindi, Bengali and Oriya) and Karinga in Marathi.

Scientifically called *Gardenia jasminoides* Ellis (or *G. florida* L.). It belongs to Madder family-Rubiaceae. *Gardenia* is named in the honour of Dr. Alexander Garden (1710-1791) of South Carolina, U.S.A., jasminoides is given for its similarities with the Jasmine flowers whereas *florida* is a Latin word, meaning many flowered.

Native of China and Japan, very common in almost all Indian gardens in plains for its shining, neat handsome foliage and mainly for strong-sweet fragrant and 'Camelia' like showy flowers, which attract the passers-by at once. Flowers are considered to be sacred by Hindus. Plants are well suited for shrubbery, along walls, hedges and also for cut flowers.

Small trees or shrubs—2 m tall, evergreen, bushy with smooth greyish bark. Leaves—opposite or 3-whorled, oblong-elliptic, acuminate, nerves prominent, 8.0-15.0 cm long and 1.5-5.0 cm broad, shining and dark green. Flowers—waxy-white, turning creamy on ageing mostly double, with about 2.5 cm long tube; fruit—a fleshy berry, ribbed and orange on maturity; contains numerous seeds in orange pulp.

Flowers mostly during March-September and fruits in October-December.

Stems sometimes enforce rooting on plants, should be cut and planted to re-generate new plants; propagated through stem cuttings and layerings during rainy season. It is a hardy plant, can be grown in dry soil, and need pruning to maintain its size and also to get bigger size of blooms.

Variety *jasminoides 'fortunil'* dwarf shrubs, up to 1.5 m tall; flowers—white with one or two rows of petals of about 5.0 cm across, lobes—slightly drooping. It is named after Mr. Fortune of China.

Jasminoides 'vetchil', up to 2.0 m tall; flowers white, double, about 8.0 cm across and almost cup-shaped.

Medicinally leaves are given in fevers, roots used in dyspepsis, nervous disorders and paste applied on head to cure headache. Fruits given in jaundice, renal and pulmonary troubles and yields yellow dye.

Chandani or Crape-Jasmine

It is also commonly called East Indian Rose Bay, Wall flower or Moon beam or Eye flower or Clavel de la India or Nero's crown and in local languages is called as Nandivriksha, Tagora (Sanskrit), Tagar (Hindi and Bengali), Sagar, Tagar (Gujarati), Ananta, Gondetagora (Marathi), Gandhi tagarapou, nandhivordhanamu (Telugu), Addukkunandi-Yavattai, Karuduppalai, Nandiyarvattam (Tamil), Kottuhale, Nandbatlu (Kannada), Kuttampale, Nandiyarvattam, Takaram (Malayalam).

Botanically known as *Tabernaemontana divaricata* (L.) R. Br. (or *Ervatamia coronaria* Stapf) of Dogbane family – Apocynaceae. The name *Tabernaemontana* is given in honour of a German Physician and Botanist J.T. Tabernaemontanus and *divaricata* in Latin means – spreading widely.

It is considered to be an Indian plant and is found throughout the sub-Himalayan tract, from Garhwal eastwards to Assam, extending southwards to coastal regions of Andhra Pradesh and hills of Vishakhapatnam and is cultivated on large scale for flowers which are in heavy demand in market for religious and social functions. It is also grown in gardens

and parks for its handsome foliage and large, single or double, pure white, enamel coloured flowers, which are mostly found flowering throughout the year. Its profuse white flowers provide dazzling effect against darkgreen and glossy leaves. Plants are very much suited for moonlit gardens.

Shrubs—evergreen, much branched, large, 1.5-4 m high with spreading habit having silvery-grey bark. Leaves—simple, opposite, undulate, lanceolate, sharply pointed, smooth and glossy-green. Flowers—milky or snow-white, 3.5-5 cm across with yellow centre, single, semi-double or double, sometimes with 16 petals, with greenish-white corolla-tube, borne in clusters of 20 or more, in terminal or axillary cymes. Flowers fragrant at night and almost scentless in the day. Fruits—a pair of follicles having many small light seeds. Fruits are rarely seen in plains.

Plants are available with many horticultural varieties such as :

Tall plants with small leaves having single flower with curved and pointed petals; dwarf plants having single, scented flowers with flat and rounded petals; medium-sized plants with semi-double flowers – 'Flore pleno'; medium-sized plants with variegated leaves and single flowers – 'variegata'; large-bushy plants with variegated leaves and double flowers and medium-sized plants with large and broad leaves having single large flower with rounded lobes – 'White-Wing'.

Flowering throughout the year, but profuse during summer and rainy season (April–September).

Easily propagated through stem cuttings and by layerings. Cuttings are made during rainy season. Being a hardy plant, it can be grown in any soil and climatic condition. It is suitable for shrubbery borders, it stands severe pruning but unsuitable to form a hedge. Variety 'variegata' is suitable as indoor plant.

Medicinally, flower juice is used to relieve sore-eyes.

Common Crape Myrtle

Locally called Sawani, Goolfanoos, Phurus (Hindi), Phurus (Bengali), Sawani (Punjabi), Chinai Mendhi (Marathi), Chinagoranta (Telugu), Pavalak-Kurinjil, Sinnapau in Tamil.

Botanically known as *Lagerstroemia indica* L., Common Craps Myrtle belongs to family Lythraceae. *Lagerstroemia* is named in honour of Magnus V. Lagerstroem (1696-1759), a Swedish friend of Charles Linnaeus and *indica* refers to its nativity.

Shrubs—1.5-4.0 m tall, erect, glabrous and much branched; bark—grey, smooth and new shoots angular, brownish and glabrous. Leaves—in whorls of three or upper ones alternate, oblong or elliptic, 2.5 to 5.00 cm long, with clear vein on dorsal side. Flowers—axillary for terminal white, rose, pink or purple with fringed petals. Fruits—capsular with many small brownish seeds.

Flowers from May–August and generally propagated through stem cuttings and rarely by seeds.

Though native to China and Australia, it is very commonly grown in Indian gardens since 1794 as shrubbery and also as single for its varied colour of blooms, renders a spectacular quality to look, specially with different varieties and colours when in full bloom,

viz., *aliporensis* (Light Mauve flowers); *candida* (white flowers) and *rosea* having rose coloured flowers; planted in a group and are very much suited due to its good shape.

Plants need pruning after leaf fall during March–April to obtain good flush of bloom which mostly appear on new canes.

Plants also considered as medicinally important and used as purgative and bark used as stimulant.

Other commonly grown Lagerstroemias for its flowers are: Giant Crape Myrtle or Queen of Flowers or Pride of India [*Lagerstroemia speciosa* (L.) Pers. (or *Lagerstroemia flosreginae* Retz.], locally called Jarul (Hindi, Bengali & Punjabi), Patoli (Oriya), Ajar (Assamese), Taman (Marathi), Varagogu (Telugu), Kadali (Tamil), Hole–dasavala, Challa (Kannada) and Manimaruthu in Malayalam.

In Latin *speciosa* means beautiful and *flors-reginae* means Queen's flower.

Trees—4.0 to 15 m tall; bole short, branches big smooth bark, greyish or cream coloured which peels off in broad irregular flakes. Leaves—large, simple, oblong–lanceolate shaped in opposite pairs, pointed at the tip with clear veins. Flowers—large, in various shades of violet, lilac, purple or mauve, changes on ageing with vivid petals. Fruit—a capsule, dark brown having numerous winged seeds.

Flowers in April–May and July–August and fruits are seen almost throughout the year. Propagated through seeds, and plants flower after 4–6 years. It is an indigenous tree, commonly planted in gardens and parks, avenues, along large lawns and around water tanks and ponds, well suited for city roadsides for its beautiful, attractive flowers which mask the entire tree when in full bloom. Tree is well suited to warm humid climate and in moist deep soil, also well suited in water logged areas.

Wood being hard, suitable for various constructions, railway carriages, furniture and telegraph posts; leaves given as purgative; decoction of dried fruits and leaves used in diabetes and also yield tannin.

Jarul (*Lagerstroemia thorelii* Gagnep), tree of Cochin–China, much planted in India on avenues, in gardens and parks for its ornamental, showy flowers, being less vivid than Giant Crape Myrtle; 5.0-12.0 m tall, trunk—short, uniformly spreading crown; bark—pale yellowish-grey which peels off in irregular patches. Leaves—opposite in pairs, elliptic and pointed. Flowers—purple or lilac, appear on long, axillary panicles, which turn pink and fade to white. Fruits—egg–shaped, contain numerous winged seeds.

Flowers during August–November and fruits during October–January. The leaf falls during cold season and new reddish leaves appear and changes green in a few days.

Propagated through seeds and generally flowers after about 5 years.

Common Oleander

Common Oleander is popularly called Indian Oleander and Sweet–scented Oleander; and Karavira in Sanskrit and locally called Kaner, Karber, Kuravira (Hindi), Karabi, Rakta Karabi, Sweet Karabi (Bengali), Konero, Korobiro (Oriya), Kanher, Kaneri (Marathi), Kagaer (Gujarati), Ganneru, Kastoori pattelu (Telugu), Arali (Tamil), Kangalu (Kannada) and Arali in Malayalam.

Botanically called *Nerium indicum* L. (or *N. odorum* Soland) and belongs to the Dogbane family – Apocynaceae. *Nerium* is derived from the Greek word 'Neros' meaning moist habitat (place of growing) and *indicum* refers to its nativity; and *odorum* from word odour means fragrant flowers. Though native of China, Cochin–China and mediterranean region, it got introduced in India, and now very commonly grown in gardens and parks for beautiful charming flowers.

Shrubs—tall, evergreen, milky, with 3 m height and spreading top; many rod–like straight stems arising from the ground. Leaves—leathery, opposite in whorls of three, nearly oblong–lanceolate, 12-18 cm × 1.5-3.5 cm, acuminate, thick and glabrous, tapering at both ends, middle vein thick and prominent. Flowers—3 to 5 cm across, fragrant, single, semi-double or double, in many colours and shades from pink, purple, rosy–purple, red, white and even to light yellow, in terminal clusters. Fruits—in pairs (follicle) with many winged seeds.

Profuse flowering from February–April, scarce throughout the year and fruits during February–May.

Easily propagated through cuttings, air layers and sometimes by division of plants during rainy season.

Following varieties are grown:

Oleander 'album' – flowers single, large and white.

Oleander 'carnea' – flowers single, carmine red.

Oleander 'carneum florepleno' – flowers double, salmon–pink.

Oleander 'roseum' – flowers single, rose–pink.

Oleander 'variegatum' – Leaves with creamy–white edges and flowers carmine rose.

Oleander 'variegatum plenum' – Leaves dark green, edged with cream colour; flowers long, double, carmine–pink with deep rose centre.

Plants best suited to be grown in any soil and climate and suitable for shrubbery borders, fences or as screens and also as a specimen. Plants require pruning after flowering to get new shoots and vigorous blooms. Flowers suited as cut flowers.

Entire parts are poisonous and children should be kept away. Decoction of leaves are useful for skin diseases.

Crossandra

Crossandra is also called Fire Cracker Plant, locally known as Kanakambaram, Pavalakkunnja (Tamil), Gobbi, Kanakambaramu (Telugu) and Abbolige in Kannada.

Botanical name is *Crossandra infundibuliformis* (L.) Nees (or *C. undulaefolia* Salisb., belongs to Acanthus family–Acanthaceae. *Crossandra*, is derived from the Greek words 'Krossos'–fringe or ciliate; 'andros' means anthers, elaborating fringed anthers, whereas *infundibuliformis* denote its funnel–shaped flowers and *undulaefolia* refers to its undulated leaves.

Undershrubs—1 m tall, evergreen; leaves glossy, opposite or whorled undulate or entire; flowers—in linear–oblong spikes, in four rows, funnel–shaped, sessile, bracts promi-

nent and green. Corolla–tube—long, linear, slightly swollen at the base; orange yellow, deep–orange or salmon–pink, up to 3 cm long, lobes—5, unequal; stamens—4, attached in the tube. Fruits—oblong, acute, capsules.

It is a native of India, particularly from peninsular parts and also distributed in Sri Lanka, much cultivated commercially in South India for heavy floral demand, specially to adorn hairs of ladies and for preparationof garlands either alone or mixed with the white and fragrant flowers of jasmines.

Flowers almost throughout the year, but profuse during April–September. Propagated through seeds and stem cuttings.

It is a hardy plant, can be grown in semi–shaded or in full sunshine. Well suited to grow in rich loam and black cotton soils mixed with leaf–mould. 50 kg urea, 100 kg superphosphate and 60 kg of muriate per ha given two times at intervals of 6 months after 1-2 months of planting. Weeding, interculture, mounding the base and regular watering results in better growth and yield. It is also planted in shrubbery borders.

Plants get affected by wilt, causing defoliation and decaying of roots, soil should be drenched with 1% Bordeaux or 0.3% brassicol for control. Scales, white–fly and bugs are checked by spraying with 7% phosalone two times at fortnightly intervals. Nematode affected fields are mixed with temik 10 @ 25 gm per square metre.

Crossandra has four cultivars, namely 'Delhi', 'Lutea', 'Orange' and 'Sebaculis' red.

Datura or Thorn Apple

Datura is also called Dhastura (Sanskrit), Sadadhatura (Hindi), Dhatura (Bengali & Marathi), Vella-oomattai (Tamil).

Scientifically named *Datura metel* L. (or *Datura fastuosa* L.; *Datura alba* Nees; *Datura fastuosa* L. var. *alba* (Nees) C.B. Clarke) and belongs to Brinjal family – Solanaceae. *Datura* is named from the Sanskrit word 'dhatura' or 'dhattura' and *metel* is named on vernacular East Indian name.

It is generally found throughout the hotter parts of India, in waste lands as a common weed. It is recognised by its large, gramophone–shaped flowers, but has not found its place as garden plant, though mostly planted near 'Shiva' temples, flowers and fruits being offered and considered to be religious and associated to him.

Herbs—shrubby, soft–wooded, glabrous or minutely pubescent, up to 1.5 m tall, but woody at the base. Branches—zigzag, purplish with white spots. Leaves—ovate, lanceolate, 15-18 cm long and unequal at the base. Flowers—erect, corolla violet or purplish outside and whitish inside, large, about 12-15 cm long and shallowly 5-lobed. Fruits—(capsule) round and covered with small blunt spinous growth (tubercles) with many, small seeds.

Flowering and fruiting occurs from July to December. Seeds easily germinate and plants grow in any soil having hot-humid climate. Requires little care to grow.

Flowers open only after sunset and in the night and close in high intensity of day light. Generally, flowers in double form are also found but triple form is rare in cultivation, and these two forms are varieties 'Huberiana' with white and violet colour, whereas, *'alba'* with white flowers.

Entire plant is considered to be narcotic and poisonous. Leaves are used for preparing cigarettes to cure asthmatic patients.

Garden Hibiscus

Commonly called Shoe flower or Chinese Hibiscus; Japa, Java, Rudra Pushpam (Sanskrit), Gurhal (Hindi), Jaba (Bengali), Dashindach phula, Jasavanda (Marathi), Mondaro (Oriya), Joba (Assamese), Jasum (Punjabi), Jasuva (Gurarati), Semparuthi (Tamil), Chembarathi (Malayalam), Java Pushpamu, Dasana (Telugu), and Dasavala (Kannada).

Hibiscus belongs to Okra or Lady's Finger family – botanically called Malvaceae named Hibiscus rosa – *sinensis* L. *Hibiscus* is derived from Greek word 'ebiskos' or 'ibiskos' and Latin word 'hibiscum', 'ebiscum' or 'hibiscus' referring to marsh mallow; and rosa-sinensis refers to its common English name, China Rose or Rose of China, being its native home.

Most commonly planted in gardens and parks of India by almost all plant lovers for its ornamental flowers, which are also associated with Goddess Kali. Planted as single in lawns or hedges and also as a pot plant.

Small to medium-sized shrubs, with dark green and smooth leaves. Flowers—large, single, bell-shaped, filaments united to form a single staminal tube, but with free anthers, exerted on a long style. Flowers are of various colours and different shades of white, yellow, pink, orange, red, violet, even bicolour, etc.

Flowers almost throughout the year, but profuse during April to September.

Propagated by stem cuttings and air layerings during rainy and autumn seasons and by budding during autumn in the south, particularly in Bangalore.

Many varieties and hybrids having difference in colour, size, shape and number of petals, single or double forms and even with variegated leaves are found in cultivation.

Besides its ornamental value, flowers yield a dark-purplish dye, used for making shoe polish, aids in digestion, is used in bronchial troubles; green leaves are used as laxative and the root-bark is used as medicine for cough, fever and veneral diseases.

For good growth and flowers, moderate temperature and high humidity are essential. Porous sandy loam soil mixed with well decayed compost are best suited. In gardens having clay soil, pits of about 75 cm depth and diameter are to be dug and filled with a mixture of well rotten leaf mould, bonemeal and soil. Soil should be raised about 30 cm above the ground level, watered to settle down the soil and planted during morning or late evening. Bonemeal improves the flower colour.

Water-logged areas are not suitable for its growth and flowering, hence proper drainage is essential.

Mites, red-spiders and Jassids cause harm to Hibiscus, reducing growth and flowering. Judicious spray of Gamexine (5%) at regular intervals is to be done as a control measure.

Other commonly grown garden Hibiscus are: The Japanese Lantern or Coral Hibiscus or Fringed Hibiscus [*Hibiscus schizopetalus* (Mast.) Hook.f.], which is a native of tropical Africa with small dark-green leaves, deeply cut pink-streaked orange-red, drooping flowers, which are its interesting features. Planted for hedges, living screens and in shrubbery borders. Flowers during April to December. Propagated through cuttings in rainy season.

The Changeable Rose, Cotton Rose, Chinese Rose, (*Hibiscus mutabilis* L.) is of Chinese origin; large shrubs with broad leaves; flowers—large, double, pinkish-white changing to deep-pink due to aging and intensity of light. Suitable for shrubbery borders as well as individual for its flowers and as hedges. Plants are pruned after flowering for good bloom. Flowers during May to October; easily propagated through stem cuttings, layers and seeds.

Probably first introduced in the Indian Botanic Garden, Howrah, before, 1794 and spread to other parts of the country.

The yellow Mallow Tree (*Hibiscus tiliaceous* L.), a straggling, bushy tree of Indian origin with heart-shaped leaves, flowers—lemon-yellow with brown-red centre; flowers are showy but are less in numbers in comparison to its heavy foliage. Grows well in marshy and shaded places. Propagated through stem cuttings and seeds. Flowers almost throughout the year but profuse during April to July. This species is less grown in the gardens.

Rose-of-Sharon or Shrubby Althaea, Swet Joba (Bengali); (*Hibiscus syriacus* L.) is a native of Syria. Many branched shrubs with short, 3-ribbed petiole, found in Indian Gardens for ornamental white or bluish flowers with single or double forms. It grows in almost all climates. Plants do not stand to pruning. Propagated through stem cuttings. Flowers during May to September.

Hara Champa

Its common names are Tail-Grape of Climbing ylang-ylang or Songsong and locally called Champa, Hara Champa (Hindi), Kath Champa (Bengali), Hirva Champa (Marathi) or Madam mast or Manoranjitam in south Indian languages.

Botanically called *Artabotrys hexapetalous* (L.f.) Bhandari (or *Artabotrys odoratissimus* R.Br.), belonging to Custard –Apple family–Annonaceae. *Artabotrys* is derived from Greek words 'Artanae, artao', meaning hung up and 'botrys' a bunch of grapes or fruits suspended by curious tendril, *hexapetalous* with six petals and *odoratissimus* means fragrant flowers and fruits.

It is a native of India and Sri Lanka, common in southern parts of India, particularly in the western peninsular region and cultivated in gardens throughout India, for its very fragrant flowers and fruits, which are generally hidden under leaves. Its sweet odour attracts passersby.

Climbers or semi-scandent, glabrous, shrubs—evergreen, woody, with dense and handsome foliage. Leaves—opposite, oblong, lanceolate, dark green shining, glabrous, 10-16 cm long and 3-5 cm broad, acuminate and blunt in the end; flowers—large, 1 or 2 appearing on woody, hooked/recurved peduncles, in axils of leaves, greenish or yellowish, emiting very strong odour, characterised by trimerous flowers with 3 sepals, 6 thick petals in two series of 3 each with indefinite stamens and 6-10 carpels but rarely tetramerous with 4 sepals and 8 petals in two series of 4 each; stamens—numerous; fruit berries—oblong and slightly pointed at the base, smooth and fragrant.

Flowers during July to October and fruits in September to December. Easily propagated by seeds and layers during the rainy season.

Plants require rich and porous soil and enough organic matter and grow well under semi-shaded places particularly beneath large trees; suitable to grow in back rows of shrubbery borders:

Flowers are kept in houses for its delicious, palatable fragrance and yield an essential oil, used in perfumery.

Ixora

The term *Ixora* is derived from the Sanskrit word 'Iswari'–a goddess. Varieties of this flower are offered to Goddess Parvati for worship. It belongs to the Madder family–botanically called Rubiaceae.

Plants—in this group are mostly evergreen shrubs or small trees. Leaves—mostly opposite, simple, small to large, generally obovate, obovate-oblong or broadly lanceolate, green or dark green. Flowers in clusters. Corolla-tube—long, with 4-lobes, have many colours (white, pink, scarlet, yellow, orange-scarlet, etc.). Fruits hard—or fleshy, usually with two oblong seeds.

Many varieties of this group are very attractive and eye catching. Commonly grown in gardens, parks in shrubbery borders, in group or to form compact hedge, some are suited for topiary. Generally flowering throughout the year, but profuse during March to November. Plants are maintained properly with little care, manuring and pruning. Propagated through seeds, cuttings, layerings and grafting but moslty through stem cuttings.

A large number of species and varieties having good and attractive flowers are under cultivation in Indian gardens, however, the following are most common.

Chinese Ixora (*Ixora chinensis* Lam.), the specific name refers to the country of origin. Shrubs with orange flowers when in bloom and later turn into brick-red or salmon-red. Propagated through stem cuttings. Plants suited for lawn, hedges and suitable for pot cultivation. Also used to cure tuberculosis and given in urinary problems.

Scarlet or Jungle Flame Ixora (Rangon or Rookmini (Hindi & Bengali), Pendgal (Marathi), Koranam, mankona (Telugu), Chetti Vedchi (Tamil), Thechil, thetti (Malayalam), Kepala (Kannada), Romaniphulo (Oriya); *Ixora coccinea* L.; specific – name in Latin means scarlet colour of flowers; is a native to south-western India. Shrubs—.0-1.5 m tall, bright scarlet flowers appear in large heads or clusters at tips of the branches, gives a magnificant look and one of the most commonly cultivated species among Ixoras.

Propagated through seeds, layers and cuttings during the rainy season.

Wood being hard is suitable for tool handles. Leaves used for sores, ulcers, etc. and root is antidysenteric.

Yellow Ixora (*Ixora coccinea* var. *lutea* Corner); shrubs, with attractive foliage produces yellow flowers having little broader petals in large clusters.

Torch wood/torch tree, Kotu Gandhal (Hindi); Rangon (Bengali); Kilakraya or Telokry (Oriya), Negali, raiku (Marathi), Nevari (Gujarati), Korivipala, puttupala (Telugu), Shulundukora (Tamil) and Gorabikkatige (Kannada); *Ixora parviflora* Vahl, specific name refers to its meaning small flowered in Latin. Small, evergreen trees, much branched and bears glossy foliage. Small, dirty-white, un-attractive flowers appear in clusters at the ends of the

branches. Native to India, suited to grow in any soil and shade. Flowers during March to April, and propagated from seeds, cuttings and layerings. Requires little care to cultivate. Dried and outgoing branches are required to be pruned to get proper shape. Suitable to plant in back row of shrubbery border.

Leaves, used as fodder. Wood being hard, suitable for engraving. Roots or fruits are given for urinary troubles.

Pink Ixora (*Ixora rosea* Wall.); its specific name refers to the colour of flowers. A native of Moluccas and China, straggling shrubs—up to 1.5 m tall. Flowers—pale-pink in large round corymbs, changes reddish after aging, looks beautiful alongwith its shining dark-green leaves. Flowers during August and September and easily propagated through stem cuttings in sand beds or by layerings during autumn or rainy season. It is well suited for hedges and also as a border plant.

Singapore Ixora (*Ixora singaporensis* Hort.), its specific name refers to its place of origin. Tall shrubs, up to 1.5 m high, bears lanceolate and broad shining, green leaves and beautiful, orange-scarlet-flowers which appear in large clusters at the ends of branches. Well suited for cultivation as a specimen or in shrubbery borders in parks, gardens and in residential buildings due to attractive and colourful flowers which appear almost throughout the year, however, profuse during May to August. Undesired and out growing shoots may be cut off, when plants are not in bloom to have desired height, to maintain shape and also to get good flowering. Easily propagated through stem cuttings and by layerings.

Requires little care to grow, and blooms occur within 2 years.

Jasmine

Jasmine is a collective word for *Jasminum*. It belongs to Olea family–Oleaceae, derived from Arabic words Yas (a) min; Persian words Yasman, Yasamin, and also said to have come from Greek word 'iasmelaion' 'iasimon' meaning flower and scent, which generally these plants contain and famous for its well known perfume.

Jasmines—are erect or shrubby or climbing plants; leaves—opposite, rarely alternate, simple trifoliate or imparipinate with 3-7 leaflets; flowers—usually sweet-scented and handsome in terminal or axillary cymes, rarely solitary, white, yellow or red in colour; bracts linear small or ovate, bracteoles usually linear; calyx—usually bell-shaped or campanulate with 4-9 linear lobes; corolla tube—narrow, more or less elongate, 4-10 lobes spreading; stamens—2, short and usually included in the corolla; berries—having 1-2 seeds.

Out of about 90 species occurring in tropical, subtropical and warm temperate climate, only about 40-species occur wild in India. Important common ones, found wild or grown for its flowers, or for its known Jasmine perfumes, and also for horticultural trade are: Furry Jasmine, Star jasmine, Pinwheel jasmine, Downy jasmine or Angel-hair jasmine [*Jasminum multiflorum* (Burm. f.) Andr. or *J. pubescens* Willd.] Kunda, Sadapushpa and Vasanta in Sanskrit and locally called Kundphul, Kund, Kunda, Chameli (Hindi), Kundphul (Bengali), Mogra, Gujari (Marathi), Kundamu (Telugu), Malligai (Tamil) and Kurukuttimulla in Malayalam.

Multiflorum means plant having many flowers and *pubescens* means hairy, which denote the characters of this plant.

Scandent shrubs, evergreen; bark-light green and extremely thin, young branches silky pubescent and often rusty. Leaves—opposite, simple 4.7 × 2.4 cm, ovate acute, rounded or cordate the apex; flowers—white, single or double, fragrant, born in dense, terminal capitate cymes, sessile, covered with yellow hairs, corolla tube—slender, about 1.8 cm long; lobes—7-9. Fruit—a glabrous black berry, surrounded by persistent calyx.

Flowers during December-June. Plants are propagated through cuttings and division of plants during rainy season.

Indian plant, found wild in Persia and Kashmir are very commonly planted in gardens and private houses for its cluster of fragrant flowers. They look very ornamental in full bloom. A hardy plant, it can be easily grown in sunny situations as well as in poor soil. Plants require pruning before rains for proper maintenance of its size and shape and for good flush. Plants are generally affected by mosaic due to insects which can be controlled by insecticides.

multiflorum var. "rubiscens", corolla, outer pink and inner surface white.

Root decoction given as an antidote to Cobra venom and dried leaves employed in poultices against ulcers.

Arabian Jasmine or Tuscan Jasmine [*Jasminum sambac* (L.) Ait.], is called Mallika in Sanskrit and its local names are: Mogra (Hindi), Motia, Mogra (Bengali), Batmogri (Marathi), Boddumalle, gundumalle (Telugu), Adukkumalli, gundumalli, Kuda malligai (Tamil), Elusut-tumallige Kolumallige (Kannada), and Cherupichakam, Kudumulla, Mallamulla in Malayalam.

Sambac is the Arabic name for the shrub and Zambac in Persian.

Probably a native of Southern India.

Shrubs—suberect. Leaves—opposite, 4.0-10.5 × 2.5-6.0 cm, ovate or elliptic in shape, thin, glabrous; acute or acuminate at the apex, and rounded at the base. Flowers—white, about 1.8 × 1.5 cm across, single or double, fragrant, on terminal cymes.

Flowers during March-July. Propagated through cuttings and root suckers.

Flowers are considered sacred to Lord Vishnu, and are also in much demand owing to its being heavily fragrant for making garlands and general decorations. Varieties: 'Japanese Rai' (compact double flowers), 'Motia' (flowers medium sized and double) and 'Rai' (flowers double, medium sized and compact); Gundumali, Ramabanam, Single Mogra, Iruvatchi, Kasturimalli, Oasimalli and Soojimalli are important cultivars. These are very popular and grown commercially for their flowers and to extract perfumes, which are much valued and are in demand.

Plants need dry place, well drained soil and much suited to grow in direct sun. Plants are spaced at a distance of 1.2 × 1.2 m and require pruning after its flowering is over to promote new shoots which are followed with flowers. Generally plants are attacked by scale insects, followed with black fungal growth which needs to be checked by spraying Parathion 0.025% with sandovit as adhesive. Wilt is of common occurrence, resulting in drying of plants for which the soil should be drenched with 1% Bordeaux mixture.

Roots and leaves are used in the preparation of eye lotions.

Mosaic is generally transmitted by insects, which are controlled with some pesticides. Mites also affect these and are controlled as under *J. auriculatum* mentioned below.

Golden Trumpet or
Allamanda - as trellis
on porches

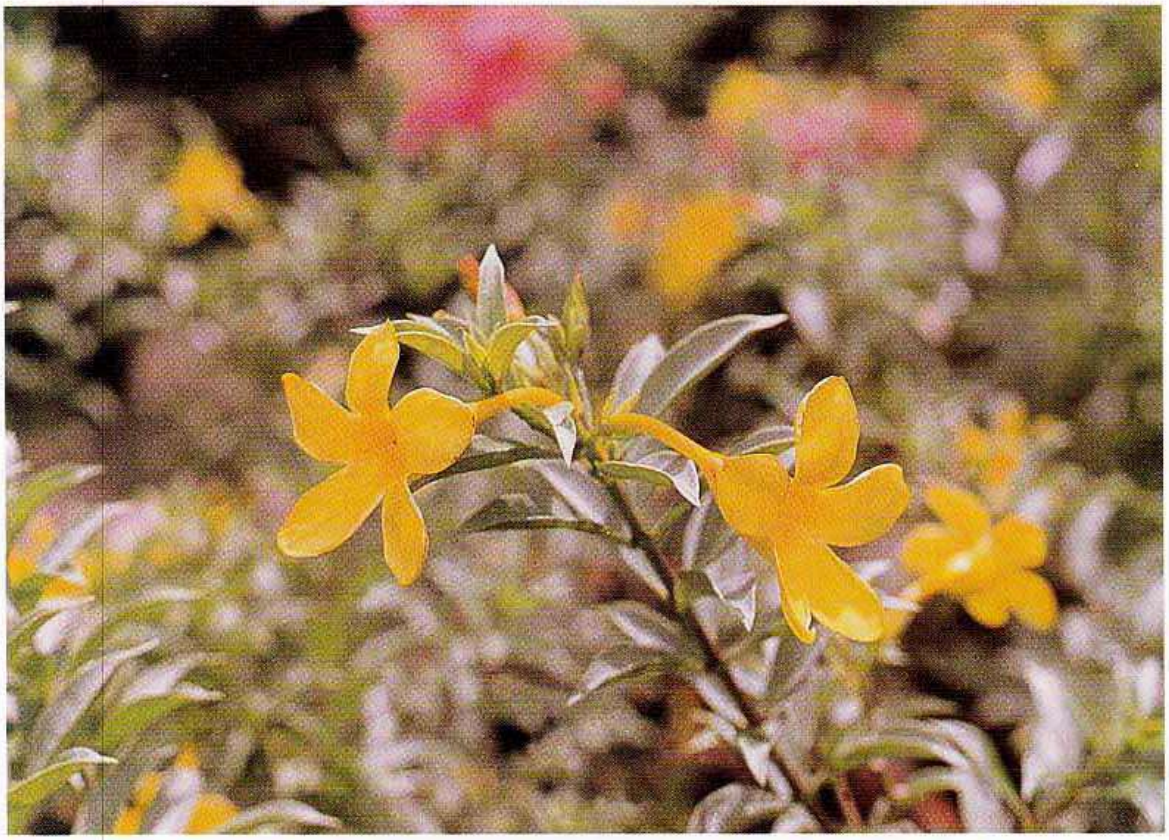
Allamanda - with flowers

'Williamsil'- double variety of Allamanda

Golden trumpet bush with flowers

Butterfly Pea with single flowers and pods

Aparajita or Butterfly Pea with single white flowers



Golden trumpet bush with foliage and flowers

Purple Allamanda with flowers

Butterfly Pea with double blue flowers

Butterflty Pea with double white flowers

Tree butterfly Pea in bloom

Tree butterfly Pea in flowers

Clock Vine in flowers

Bush Clock Vine or
Thunbergia erecta -
in flowers

Railway Creeper as trellis

Railway Creeper in flowers

Jasminum auriculatum Vahl. is called Juthika, mugdhee, suchimallika in Sanskrit, and local names are Jai, Juhi, Jui (Hindi), Umbustha, gunica, godthika (Bengali), Bonomallika, Jui (Oriya), Adavimolla, ettudavimola (Telugu), Usimalligai (Tamil), Kadavmallige, Madhyanamallige, Vasantamulle in Kannada.

Twining small shrubs or woody climbers, branched. Leaves—simple or sometime trifoliate, cordate, two small leaflets on the base of petiole grey-pubescent. Flowers—white, star-shaped and deeply fragrant.

Flowers during April-June and July-September and propagated through stem cuttings. Planted at space of 1.8 × 1.8 m yield good number of flowers; these are used for making garlands for decoration and for extraction of perfumes, hair oil and *attars*. Sometimes plants need support; dried and old branches should be cut off and removed during winter which promotes new shoots followed with good blooms. 5 cultivars, based on their flower buds are Long Point, Long Round, Medium Point, Short Point and Short Round.

Indian plant, mostly found wild in southern India, are grown commercially for its fragrant flowers particularly in U.P., Bihar and W. Bengal for extraction of perfume.

Leaves are affected by Rust, causing orange colour spots, resulting in yellowish and cranking of leaves which is controlled by dusting with sulphur 20-25 kg/ha or spraying with Bordeaux mixture, and Gall-mite, causing discoloration of leaves, are controlled by spraying with 5 applications of endrin at 10 day intervals of 2 1b 10% w.p./100 gal.

Common jasmine or Spanish jasmine *Jasminum grandiflorum* L. [*Jasminum officinale* L. forma *grandiflora* (L.) Kobusuki] is also called Spanish Jasmine; Chambeli, Chetaki, Jati and Malati in Sanskrit and locally known as Chameli, Jati (Hindi, Bengali and Gujarati), Jaja malati (Telugu), Manmadabanam, mullai (Tamil), Pichakamulla (Malayalam), Jaji mallige, Jati mallige in Kannada.

Grandiflora means large flower.

It is a native of north western Himalayas occurring up to 2500 m, and also very common in cultivation in the plains and hills and commercially cultivated for its flower being much in demand in perfume industry and is cultivated on a large scale in some parts of U.P. and also for floral needs.

Climbing shrubs, branches angled; leaves—opposite, imparipinnate, 7-11 leaflets in pairs, terminal one longer than others, glossy green; flowers—white, slightly tinged pinkish or reddish beneath, heavily fragrant, lobes spreading, star-like; calyx lobes—large, linear; corolla-tube—cylindrical, about 2 cm in length; 5-lobed, lobes—elliptic or obovate with 2 stamens.

Flowers during March-October and propagated through cuttings. For good growth and flower yield, planting with spacing 2 × 1.5 m is required.

Plants require proper support to train on walls and trellies; dried and flowered branches need to be pruned in November-December and require proper manuring during March-September to encourage good growth and number of flowers. Leaf-blight causes reddish-brown circular spots on upper surface of leaves, results in less number of flowers, which can be controlled by spraying 0.4% benlate, 0.2% dithane, 0.1% bevastin and Bordeaux mixture. Flowers are used in garlands, decorations and religious functions; yields fragrant oils which are in much demand.

Plant juice is considered to be anthelmintic and given as antidote for scorpion sting.

Generally, Jasmines are attacked by budworm, Gallary worm, Tingid Bug and scales which are controlled by spraying of a mixture of 1:500 solution of 6% BHC.

Among other Indian Jasmines *Jasminum amplexicaule* Don, Wild Jasmine, Banmallica [*J. anustifolium* (L.) Wild.], Tree Jasmine, 'Bela' (*J. arborescense* Roxb.), *J. cuspidatum* (Rottl.) Willd., 'Malati' (*J. flexile* Vahi), *J. malabaricum* Wt., *J. parkeri* Dunn. *J. scandens* Vahl, *J. sessiliflorum*, *J. trinerve* Vahl, bear white flowers, yellow Jasmine or 'Peeli chameli' (*J. humile* L.) and Primrose Jasmine (*J. mesnyi* Hance) have yellow flowers, whereas *J. nitidum* Skan (native of Admiratly Islands) and *J. azoricum* L. from Canary Islands-with white and fragrant flowers are also grown for flowers and perfume. These are generally propagated through stem cuttings or by layerings.

Madagascar Periwinkle

Popularly known as Vinca or old Maid it is locally called Sadabahar, Sada-phuli (Hindi), Nayantara (Bengali), Ainskati (Oriya), Sada-phul (Marathi), Billagamenu (Telugu), Sudkadu Mallikai (Tamil), and Ushamalari in Malayalam.

Botanically known as *catharanthus roseus* (L.) G. Don (or *Vinca rosea* L.) – it belongs to family Apacynaceae. *Catharanthus* is derived from Greek words 'katharhes' – pure and 'anthos' meaning flower. *Vinca* is old name in Latin, vin-ca, and *roseus* or *rosea* refers to rosy colour of flowers.

A native of West Indies, has been introduced in India before 1794 for its showy flowers and medicinal importance. It is very commonly grown in gardens in rockeries, beds and pots and even occurs in wastelands and suited to plant near cemetries.

It can be grown in any soil with less care; prefers full sun for flowering. It is grown by sowing seeds and also through soft-wood cuttings; and plants raised from seeds flower within 2 years.

Generally varieties, *rosea 'alba'* – white flowers having bright red or pink spot, in the centre and *'rosea' 'variegata'* – leaves whitish-variegated are in cultivation.

Medicinally, roots possess many alkaloids; one of which is considered to have anti-cancerous properties; entire plant used in diabetes and plant juice is given for relief against wasp stings.

Shrubs—erect, bushy 50 to 80 cm tall, much branched; leaves—opposite, oblong smooth and glabrous green above and light green beneath with white centered veins. Flowers—rosy-purple or rosy-red with purple throat or even pure white, star-shaped, *ca* 4 cm across; solitary or axillary in pairs and fragrant. Corolla tube—slender, cylindrical, greenish and about 2.5 cm long. Stamens—5 on the swollen parts of the tube. Fruits in pairs, about 2.5 cm long, containing many small seeds.

Its present valid botanical name is *Catharanthus roseus* (L.) G. Don.

Parijat or Night Jasmine

Also commonly called Coral Jasmine or Sorrowful tree or Night-flowering Jasmine or Indian mourner, its local names are Parijat, Sephalika (Sanskrit), Parijat, Harsingar

(Hindi), Shewly (Bengali), Godakodika (Oriya), Kapilanegadustu, Parijatam (Telugu), Manjhapu (Tamil), Harsing, Parijat (Kannada), Pervizhamalls, Parijatakom (Malayalam).

Botanically named *Nyctanthes arbortristis* L., belongs to Olea family – Nyctanthaceae (formerly Oleaceae). *Nyctanthes* is derived from two Greek words 'nyx' (night) 'anthos' (a flower) which collectively means night bloomer and *arbor tristis* in Latin, meaning Sad tree or dull coloured tree.

An Indian tree—found wild in the sub-Himalayan region up to 1500 m and in Chota Nagpur, Rajasthan, Madhya Pradesh and southwards up to Godavari. Very commonly grown throughout India near temples and in gardens for its numerous, star-like white flowers with an orange centre and heavy fragrance. It blooms in the night and falls down in the early morning forming a white carpet below the tree, and giving a fascinating sight for which it is most desired by plant lovers.

Large shrubs—or small trees, 2–5 m high, deciduous with thick rough and pale brown bark, branches—straggling and often erect, watersprouts arise from the base of the main trunk which have four angles. Leaves—opposite in pairs, simple, ovate, acuminate, rough and scabrous above, much pubescent below, margins with clear teeth. Flowers—in axillary or terminal, trichotomous cymes in small clusters at the ends of the shoots; corolla—white, 2.5-3 cm across, with 5-8 lobes of various shapes; corolla tube—orange or orange-red, about 1 cm long and strongly scented. Fruit—a flat, roundish, papery pod, separated into two parts each having one seed.

Trees shed their leaves during winter, present an ugly look in flowerless condition. In full bloom, it looks very attractive and most wanted plant for the gardens.

Flowers during September to January and fruits from November to May.

Very commonly raised through seeds but less by cuttings. Seeds germinate quickly and start flowering within 2 years. Plants require pruning after flowering and fruiting. It can be easily grown under shade and suitable to grow in any soil and even in dry climate.

Plant loses its charm and looks ugly after 3-4 years hence requires pruning for new growth and vigorous bloom. Sometimes, powdery mildew occurs on its foliage hence dusting of sulphur is recommended for control.

Flowers are offered to Hindu gods and also strung into garlands. Flowers yield an essential oil similar to Jasmine and also yield dye, suitable for colouring silk and cotton; leaves used to cure fever and in rheumatic and sciatic pain and also for intestinal worms.

Radha Chura

Known as Peacock flower, Dwarf Fence; Ratnagandhi in Sanskrit and as Gultora (Hindi), Krishnachura (Bengali), Sandhesharo (Gujarati), Pamiditangedu (Telugu), Mayikonnal (Tamil) and Settimandaram in Malayalam.

Botanically called – *Caesalpinia pulcherrima* (L.) Swartz–Radha Chura belongs to family Caesalpiniaceae.

Caesalpinia is named in honour of an Italian Botanist, Andreas Caesalpinus (1519-1603) and *pulcherrima* in Latin means most beautiful, referring to its flowers.

A native of West Indies, widely grown in gardens/parks in shrubberies and as protective flowering hedge for elegant flowers it had been in India even before 1680.

Shrubs—2.5-3.0 m high, bushy, bark silvery-grey with prickly branches. Leaves—compound, bipinnate, 20-30 cm with 3-9 pairs of pinnae having 5-12 pairs of oblong leaflets, on very short stalk and each with small pair of stipules at the base of stalks. Flowers—orange scarlet in terminal racemes or panicles, 20-80 cm long; sepals red and tinged green; petals—about 2 cm long, lobed on the margins and coloured in the middle, crimson, red, rosy-red; stamens—long and bright red, resembling 'Gulmohur' (Peacock flower) but much smaller in size. Fruit—a flat pod.

Flowers throughout the year but profuse during February-April and September-November; and fruits during November-April. Propagated through seeds and soft wood cuttings by placing in sand.

Though it can be grown in any soil, proper manuring in the form of compost or fertiliser promotes its growth and results in large panicles with big and attractive flowers.

Varieties *pulcherrima 'flava'* – bright yellow flowers; *pulcherrima 'rosea'*–rosy–red and *pulcherrima 'rubra'*–red with yellow edges are generally found in cultivation.

Besides ornamental importance, flowers yield dye; fruits give tannin, leaves serve as purgative and in cure of fevers.

Rose

Roses are considered the loveliest among the entire plant kingdom due to their delightful variety of colourful flowers, forms and scent. It was honoured as "Queen of flowers" by the Greek poetess Sapho who wrote "ODE TO THE ROSE", because of overwhelming elegance and beauty and has ever been praised by poets and admirers from time to time. It has been mentioned even in our Sanskrit literature and has been named as 'Taruni Pushpa', 'Atimanjula' and 'Samantika'. It is believed that roses were evolved 60 million years ago, probably in Asia, particularly India and Persia and from these places spread over most of the world. About 40 million years old fossil imprint of rose leaf was unearthed from Colorado and wild roses were brought under cultivation in China about 5000 years ago.

Rose, botanically grouped under *Rosa*, (Ro-sa, is the ancient Latin name), belongs to family Rosaceae, and is mostly distributed in the temperate region of tropical mountains, particularly in the Asiatic region. Out of a total of about 120 species, only about 10 species occur wild in India and four more are being cultivated for ornamental flowers and for their economic importance; they yield rose water, attar and other rose-petal products like 'Gul Kand'.

Rosa, characterized with erect or climbing shrubs, prickly; Leaves—alternate, imparipinnate, leaflets serrate, deciduous or persistent with stipules at the base of petioles; flowers—solitary or corymbose; calyx tube—globose, ovoid or flask–shaped, lobes 4-5; petals—4-5, broad and mostly rounded and large-disc lining the calyx tube, with many yellow stamens on the disc. Carpels—many. Fruit—a fleshy calyx, called 'Rose hip', contains many hard seeds.

The common, native roses, grown and used for hybridization are:

Common English Dog Rose, White Cottage Rose (*Rosa alba* L.) called Gulab (Hindi), Swet Gulab (Bengali), Gul Seoti (Punjabi), Soboti (Oriya) and Mullusevantige in Kannada.

Shrubs—up to 2 m tall, less prickly; leaflets—5-7, oblong to broad-elliptic to ovate, simply serrate, glabrous above and pubescent beneath; flowers—white, bluish or pink, single or double, 5-8 cm across, very fragrant; sepals—large; fruits—oblong or ovoid, bright red.

It is probably a hybrid between *Rosa gallica* L. and *R. canina* L. var. *dumetorum* Baker.

Flowers showy and refrigerant, used in heart palpitation and yield an essential oil.

Edward Rose, Bourbon Rose (*Rosa bourboniana* Desports), called Cheenia Golab, Desi golab, Baramasi (Hindi) and Rojapoo in Tamil.

Erect shrubs—prickly, 2.5 m tall; leaflets—5-7, ovate to ovate-lanceolate, 2.5-5 cm long, shining above, but pubescent beneath. Flowers—solitary or in corymbs, red or purple, double or semi-double and fragrant.

It is supposed to be a hybrid of *Rosa chinensis* Jacq. and *R. damascena* Mill.

Commonly grown for its fragrant cut flowers and for extraction of rose water, it is very commonly used as rootstock for budding rose and for evolving new hybrids.

China Rose, Bengal Rose, Monthly Rose (*Rosa chinensis* Jacq.), locally called Gulab in Bengali.

Shrubs—1-3 m tall, evergreen with long and slender branches with few prickles, sometimes unarmed; leaflets—5-7, acuminate, shining above, light coloured and glabrous beneath; stipules—glandular-ciliate, red or pink. Flowers—crimson or pink on long glandular stalk. Fruits top-shaped.

It is used as a parent for evolving modern garden rose varieties.

Flowers throughout the year.

Medicinally, rose-hips are applied on wounds, sprains and ulcer.

Himalayan Musk Rose (*Rosa brunonii* Lindl.) (or *R. moschata* Hook.f.)-white flowers, Ban Golab (*R. macrophylla* Lindl.)-pink, The Manipur Wild Tea Rose (*R. gigantea* Collett, *R. longicuspis* Bertol – white and *R. sericea* Lindl. – creamy yellow are Indian natives and possess fragrant flowers.

Flowers of *R. bourboniana, R. damascana* and *R. alba* are fragrant, but not suitable for decoration and bouquets due to their shape and size, but these are lacking in long keeping quality. However, these are cultivated on large scale for its ornamental look and for extraction of rose water, Attar and other rose-petal products.

Mostly, present day Roses, grown for ornamental flowers, are complex hybrids evolved through crossing and selection, and more than 10,000 hybrids, in different colour, shades, shapes and sizes with greater longevity have been evolved and are of great attraction to the floriculturists and amateurs.

Climbing roses are generally trained and allowed to grow on arches, fences, trellies or pergolas, around windows up and over doorways, storey porch and also used to cover garden fences, walls and pillars.

Among climbing roses, Polyantha (multiflora), Rambler, Wichuriana, Noisettee, Hybrid Tea, Hybrid perpetuals and Floribunda are grown.

The garden roses are classified as Hybrid Teas, Hybrid perpetuals, The Teas, The Floribunda, Dwarf Polyanthas, China Rose, Miniature, Damasc roses, Bourbon roses, Cabbage roses, Moss roses, French roses, The Alban, Musk roses, Noisette roses, Rugosas,

Scots Briars, Modern Shrubs, Rose species, the Austrian Briars and the Wichuriana ramblers and numerous varieties under each class are in cultivation.

Roses are best grown only in airy and sunny situations having very friable, clay–loam and well drained, mixed with well rotten farm yard manure at the bottom. Dead and dried, including already flowered branches are pruned off for which seasons vary from place to place. In Delhi conditions, roses are pruned between 7th to 14th October; in Bangalore twice a year, in the end of June and further in the end of December; in the plains of West Bengal, in late October or early November; in Bombay area pruning is done twice in a year, i.e. in the first week of November for winter flush and in the first week of June for monsoon flush; Brobourn roses pruned in November and Damusc roses pruned during the end of December yield much flowers. However, roses grown on hills are pruned in the end of March or April, followed with proper manuring by applying fertilizer and cow-dung-manure. Various manurial recommendations have been suggested which vary from place to place. However, a mixture of 5 kg groundnut-cake, 6 kg bonemeal, 2 kg ammonium phosphate, 1 kg ammonium sulphate, 2 kg single superphosphate and 1 kg potassium sulphate at 50-100 gm per plant are considered useful. Liquid fertilizers are better; a solution made of 1 oz ammonium sulphate 2 oz superphosphate, 1 Oz iron sulphate in 8 gallons of water applied at 2 gallons per plant, and foliar feeding also considered much beneficial than root feeding, given in a solution made with urea, dihydrogen ammonium phosphate, potassium nitrate and potassium phosphate in a ratio of 2:1:1:1, respectively; made of 30 gm mixture in 10 lit. of water added with little insecticides, or 2.5 gm each of urea and potassium dihydrogen phosphate, in equal parts, in 1 lit. of water and sprayed on both surfaces of leaves gives promising result. A mixture made of organic and inorganic manure, prepared with 8-10 kg of farmyard manure, 60 gm of bonemeal per plant gives much better result in Delhi conditions. Plant needs water at regular intervals but water-logging near the root should be avoided. Spacing of plants depend on type and variety of plants, generally 60-75 cm between plants and rows are kept, the dwarf polyanthas are planted at 45 cm apart, and climbing roses 3 m or more apart.

It is propagated by seeds, for evolving new hybrids, rootstock, cuttings, buddings, layerings and grafting. The present day hybrid roses generally do well and are multiplied through buddings.

Roses are attacked by Red scale-scrub for which apply 01.% Ethyle Parathion; Rose Chaffer is controlled by spraying with 0.2% DDT; Aphids by spraying with Basudin or Malathion, 10 ml in 10 litres of water and repeated after a fortnight; white ants-termite-bed should be pre-treated with a mixture of 5% DDT and 5% BHC in 1:1 ratio @ 3 gms per plant; Digger Wasp by applying a mixture of DDT and BHC in 1:1 ratio mixed with fungicide paste to the cut ends of pruned branches. Die-back is common for which affected parts are required to be cut-off and to be painted with fungicidal paint made of Copper Carbonate, red lead, Linseed oil in the ratio of 4:4:5 at 10 days intervals and Benlate, Captan, Karathane bayleton, Bavistin, Agrozim, Calixin and Mimorod are used as fungicidal controls; Powdery mildew attacks leaves and branches during wet atmosphere which is controlled by spraying sulphur dust, Black reddish-orange spot pustules noticed on leaves and petioles due to attack of fungus causing defoliation and less number of flowers – is controlled by spraying 0.2% Ferbam (Hexa-Ferb) or Captan soon after their detection and affected leaves should be collected and burnt. Stem blight, caused by die-back are controlled by regular spraying of Captan (2000 ppm).

It is concluded that no garden is complete without roses and it is essential for its judicious planting of selected varieties to enhance the beauty of the garden, creating aesthetic satisfaction and also for money by selling of flowers and its produce. (Late) Pandit Jawahar Lal Nehru, the first Prime Minister of India, a great lover of roses has very rightly compared wheat and rose: "Wheat is a food for body while rose satisfies aesthetic senses. We need both, wheat for strong and healthy body, rose for aesthetic fulfilment."

Considering its great popularity and demand, a Rose Society of India has been formed with its Headquarters at New Delhi and Division of Horticulture of Indian Agricultural Institute has been recognised by the International Registration Authority for Roses as National Registration Centre in India.

White Bauhinia

Generally called Kanchan, Kachnar, Safed kachnar in Hindi and Bengali, Sivamalli (Sanskrit), Kokkumandarai (Tamil) and Velluthamandaram in Malayalam.

Botanically known as *Bauhinia acuminata* L., under family – Caesalpiniaceae. *Bauhinia* is given in honour of twin brothers Bauhin Casper and Jean Johannes, known to be famous herbalists in 16th Century and *acuminata* refers to sharp and pointed lobes of the leaf.

It is a native of India, distributed particularly in peninsular to north-west India, Andaman Islands, Assam, Bihar, Meghalaya, Nagaland, West Bengal and has occupied its place in Indian gardens for its handsome foliage and large white flowers resembling orchid flowers, which blooms for longer periods. Roxburgh – known as Father of Indian Botany, remarked "It is a very specious plant, well deserving a place in the gardens of the curious".

A large, bushy shrub with reddish-brown, hairy branches. Leaves—2–lobed, glazy, pointed, having 9-11 nerves from the base. Flowers—pure white, in axillary corymbs; about 5-7.50 cm across with spreading petals. Pods—flat, containing 8-12 seeds.

Flowering continues almost throughout the year but profuse during March to September, fruits during April to September. Easily propagated by seeds and by stem cuttings, plants raised through seeds generally flower after 2 years. Plants being hardy, require little care, light pruning is done to improve shape and to get good number of blooms. A beetle known as *Batocera rufomaculata* attacks the plant, which is controlled by injecting Paradichlorobenzene, kerosene or fuel oil into the larval tunnel.

Plant is also considered to be medicinal. Decoction of bark or leaves is given to cure leprosy, asthma and stone in the bladder. Flowers eaten as raw or cooked. Seeds yield an oil.

It is suitably planted in shrubbery and in moonlight gardens.

Other notable common plants in this group being grown for ornamental flowers are:

The variegated Bauhinia (*Bauhinia variegata* L.) – Lal Kanchan in Hindi, Rakta Kanchan (Bengali), Segapumanchori (Tamil), Kanchavali (Kannada) and Chuvanna

mandaram in Malayalam. Large trees about 15 m tall with dense crown; Leaves—coriaceous with cordate base and strongly nerved. Inflorescence terminal or in axillary corymbs, flowers white with light yellow spots or pink with red or purplish spots, appear in leafless condition from late winter and continues throughout the spring (February to April), considered to be one of the very excellent among Indian trees and occupies its place in gardens, avenues, and looks attractive when in full bloom. Pods variegated with reddish–brown streaks. Propagated easily by seeds and also by stem cuttings under mist.

Medicinally, roots are given in dyspepsia and antidote to snake poison, bark used as tonic and also in skin diseases and in ulcers. Buds pickled and eaten.

The purple Bauhinia or Mountain Bay (*Bauhinia purpurea* L.) – species name in Latin means purple flowers also called kanchan, kachanar (Hindi), Kanchan, Deva Kanchan, Raktakanchan (Bengali), Deva or Rakta kanchan or Kurul (Marathi), Kanchanam (Telugu), Mandari (Tamil), Sarul (Kannada) and Chuvanna mandaram in Malayalam. Small trees, 2-7 m tall, with broad leathery leaves having two lobes, its cleft being about one third deep. Purple white or pale–violet, pretty large and fragrant flowers appear during November to December and pods 8-25 cm long flat pointed at both ends, reddish–brown with 12-16, oblong seeds are found during March to April. It mostly occurs throughout India, particularly along the foot hills of the Himalayas from Indus to Assam, up to 1600 metres and commonly grown in parks, gardens, avenues, on railway platforms and also near temples, considered sacred to Hindus, which is being associated to Lord Krishna and Goddess Shakti.

Seeds sown in April and May germinate within 4-10 days; seedlings with 3-4 leaves are planted in the field during rainy season and flowers within 2-4 years. It is suitable to be grown in any type of soil, generally in all climates and requires very little care for good growth and flowering. Out-growing branches require to be pruned for its shape.

Flower buds are eaten, bark yields tannin and dye, wood is suitable for agricultural implements. Bark is used to control diarrhoea.

The Bell Bauhinia or yellow Bauhinia or St. Thomas tree (*Bauhinia tomentosa* L.) – species name in Latin means hairy and refers to the hairy leaves and pods. Phalgu, pita, Kanchana in Sanskrit, Kanchani, Kachnar (Hindi), Irvaji (Tamil), Aptu (Marathi), Pilo asundro (Gujarati) and Kanjanam in Malayalam. It is native to hotter parts of Asia and Africa.

Shrubs—about 2-5 m high with drooping branches; Leaves—smooth on the upper surface and hairy below. Showy pendant sulphur yellow or lemon yellow flowers with a dark purple or red blotch at the base appear in pairs from axils of the branches. Flowers mostly throughout the year but profuse in March to June and August to October with many fruits in March to June. Easily propagated by seeds, easy to grow and flowers during second year of its plantation. Suitable to be planted as a single specimen or in shrubby border.

Wood being hard, is used in preparing tool handles; bark yields fibre, plants are anti-dysenteric, used in liver complaints, and plant parts are used in Ayurvedic medicines.

Hongkong Orchid Tree, known as *Bauhinia blakeana* Dunn from Hongkong, is a recent introduction and had occupied its place in Indian gardens for its beautiful, charming and eye catching, elegant flowers, about 12 cm across having rich reddish or rose–purple, almost crimson colour, appear in clusters from October to March adding special beauty to the garden.

Barleria cristata 'Candida' -habit and in flowers

Barleria cristata 'Lancasteri' in flowers

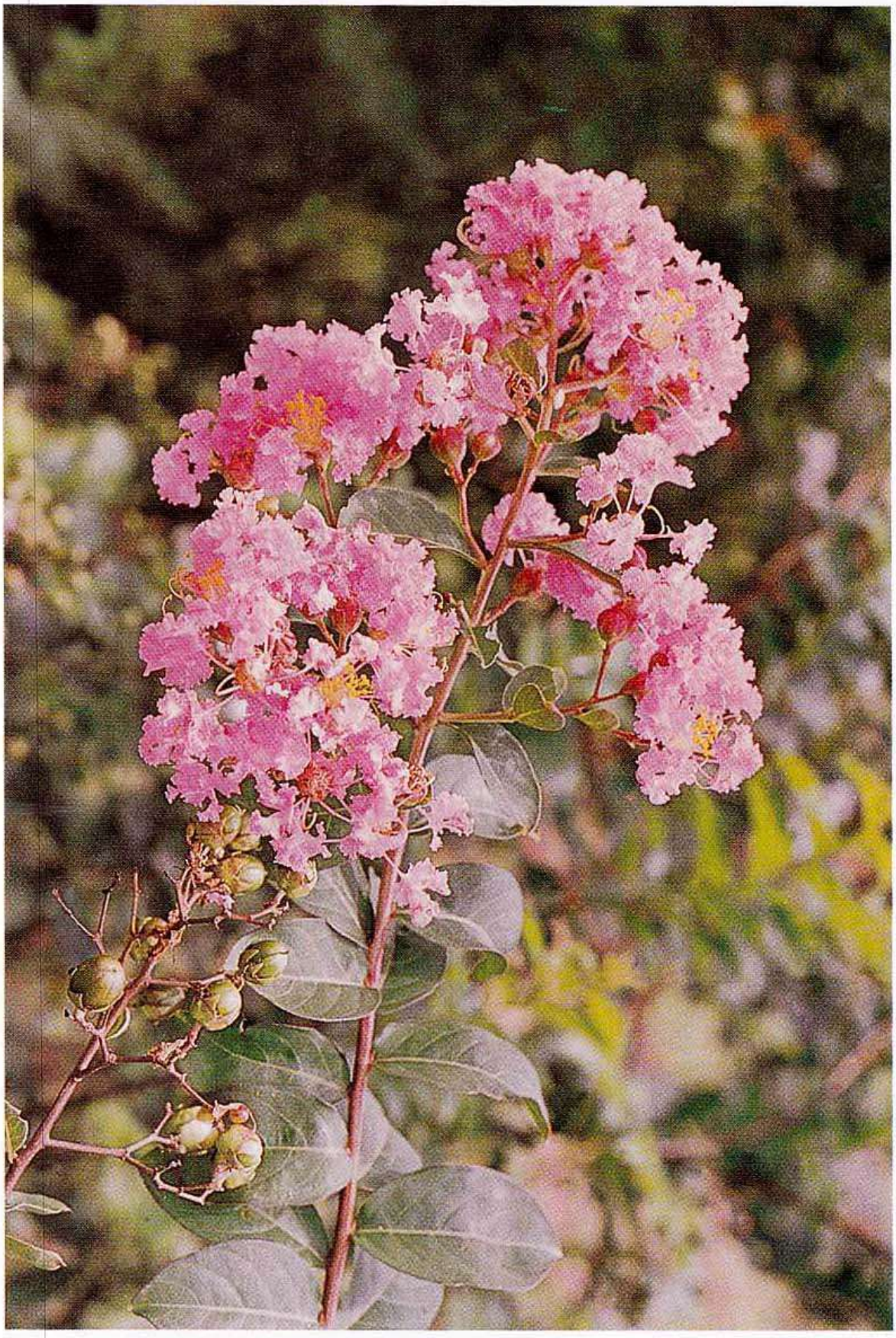
Cape Jasmine in flowers

A Chandani variety 'Variegata'

Chandani with flowers

Another Chandani
variety 'Flore-pleno'

A common Crape Myrtle variety 'candida'

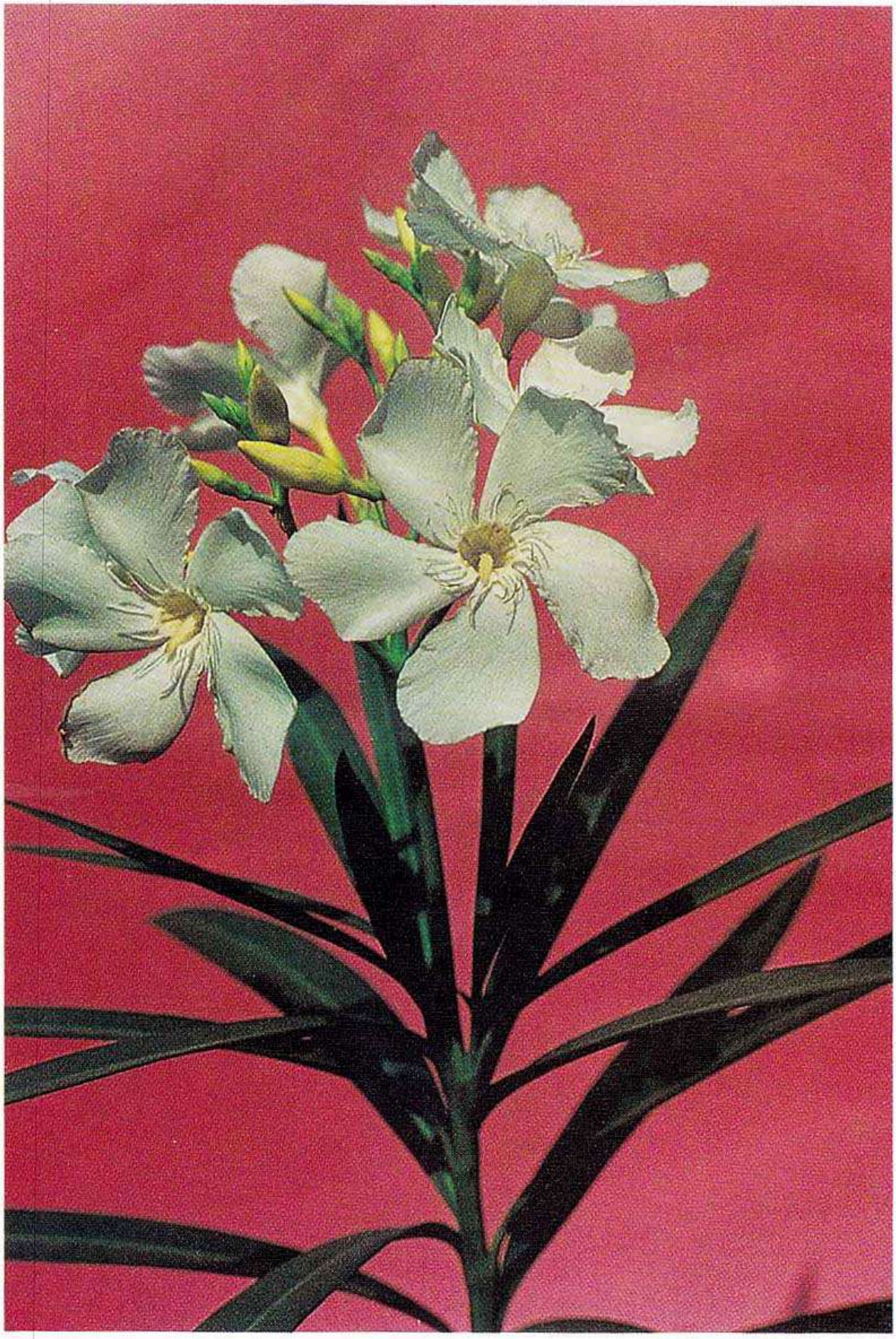


Common Crape Myrtle - variety 'rosea'

Giant Crape Myrtle in flowers

Jarul tree showing habit and in full bloom

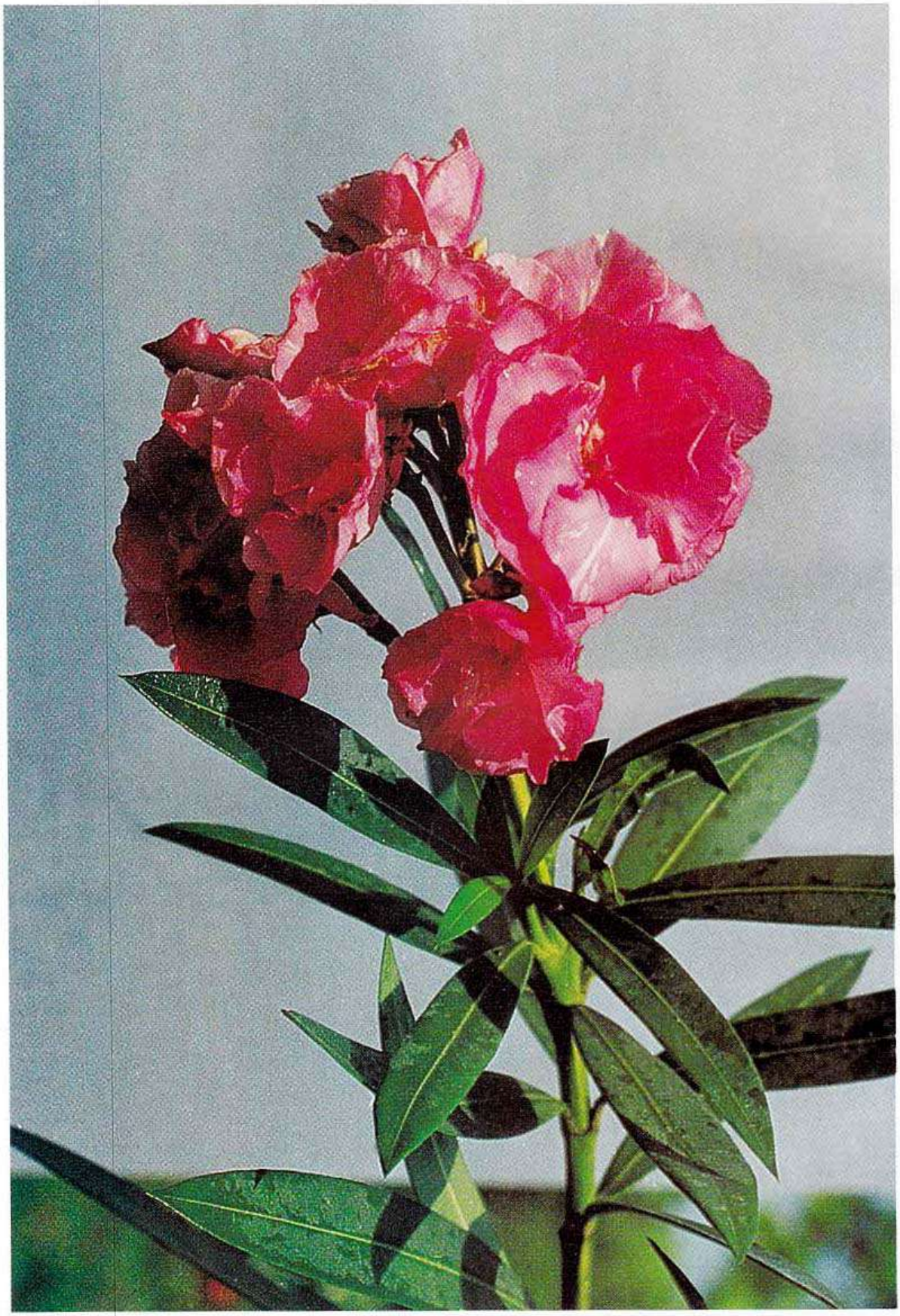
Jarul in flowers



Common Oleander 'album' in flowers

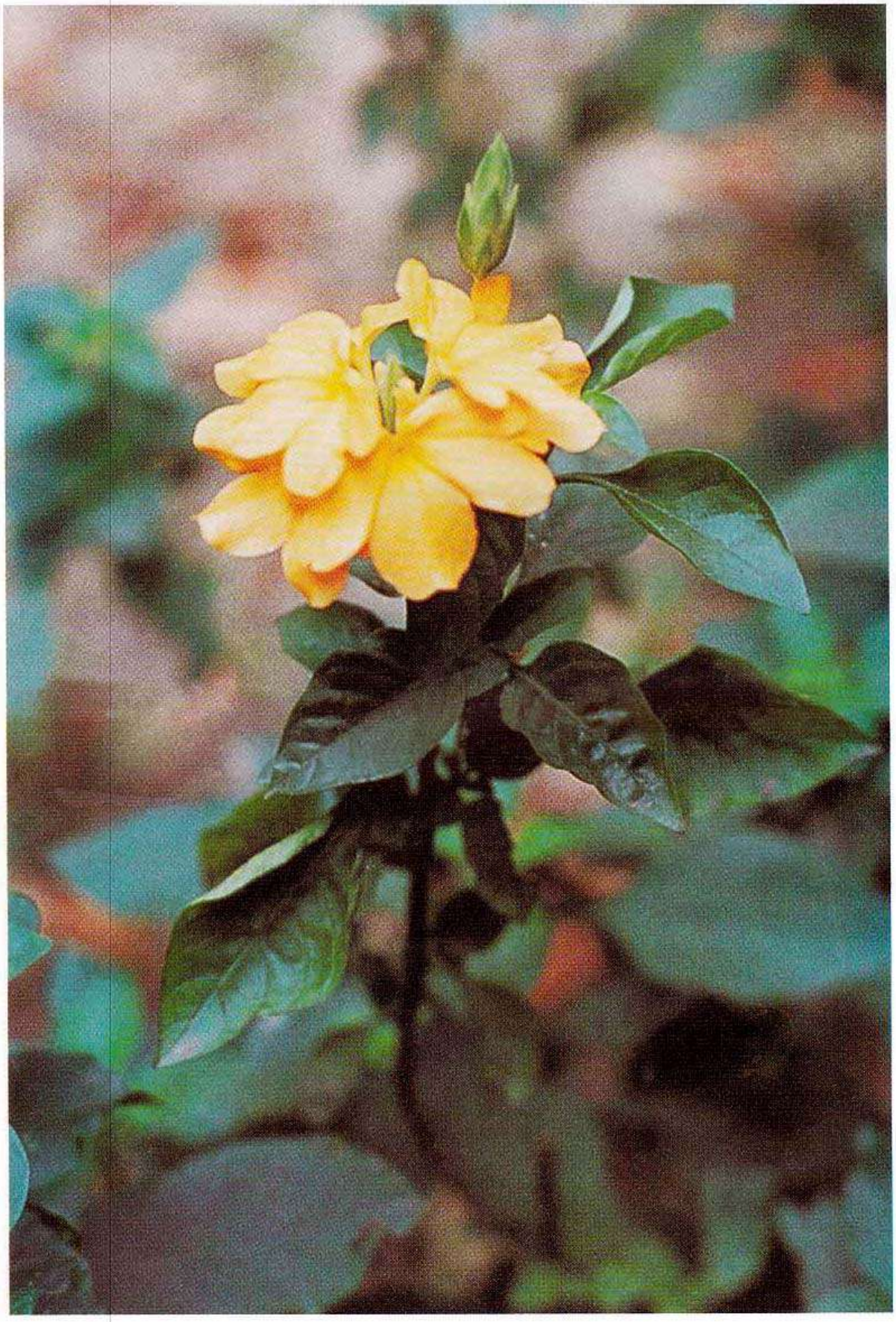
Common Oleander 'carnea' in flowers

Common Oleander 'roseum' in flowers



Common Oleander 'carneum flore pleno' in flowers

Crossandra-habit and in flowers



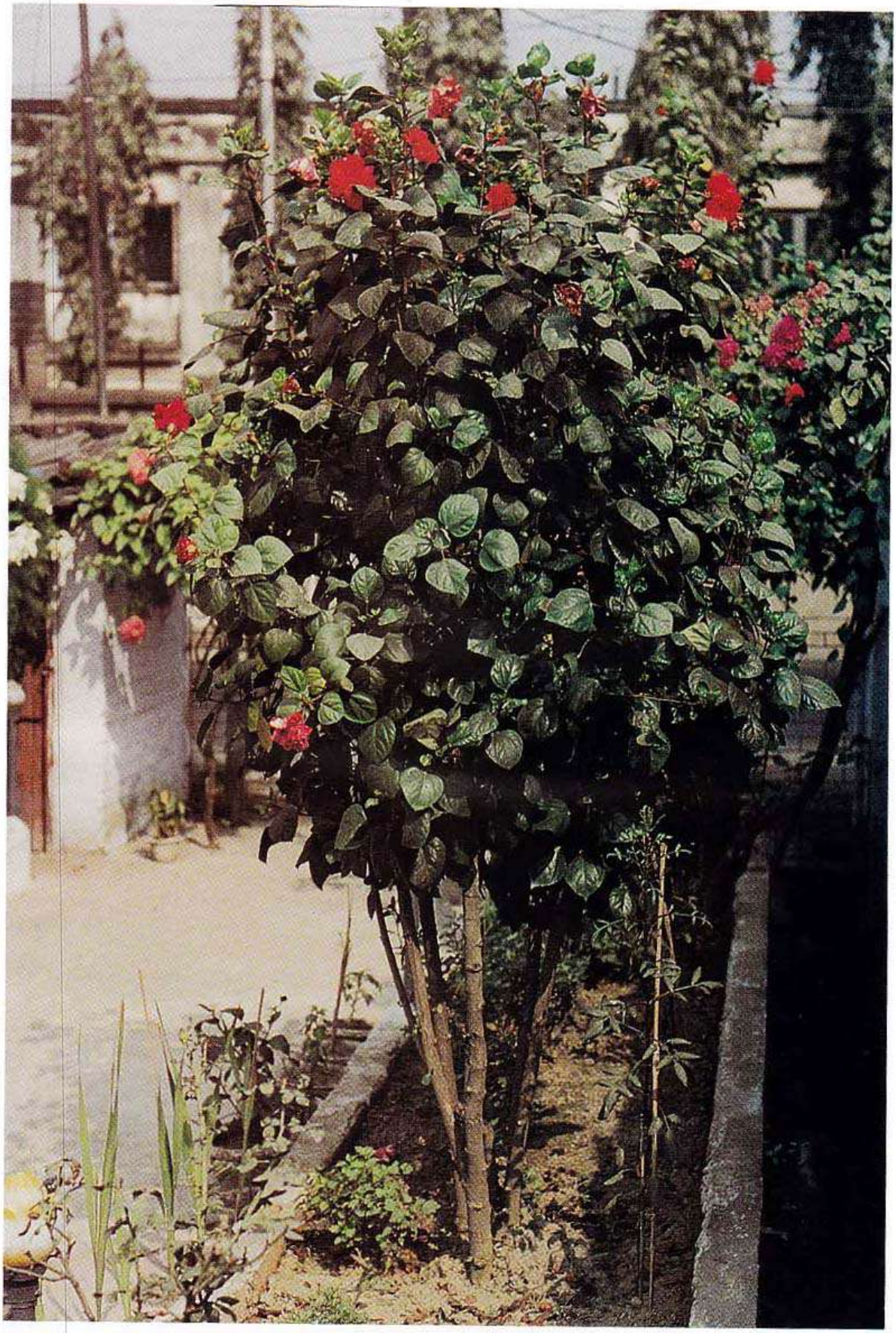
A Crossandra variety 'lutea' in flowers

Datura in flowers

A Datura variety 'Huberiana' showing a double flower

Datura variety 'Huberiana' showing triple flower

Garden Hibiscus - a typical flower



Garden Hibiscus - habit with flowers

Garden Hibiscus - 'Red satin' variety

Garden Hibiscus - hybrid flower

Garden Hibiscus - hybrid flower

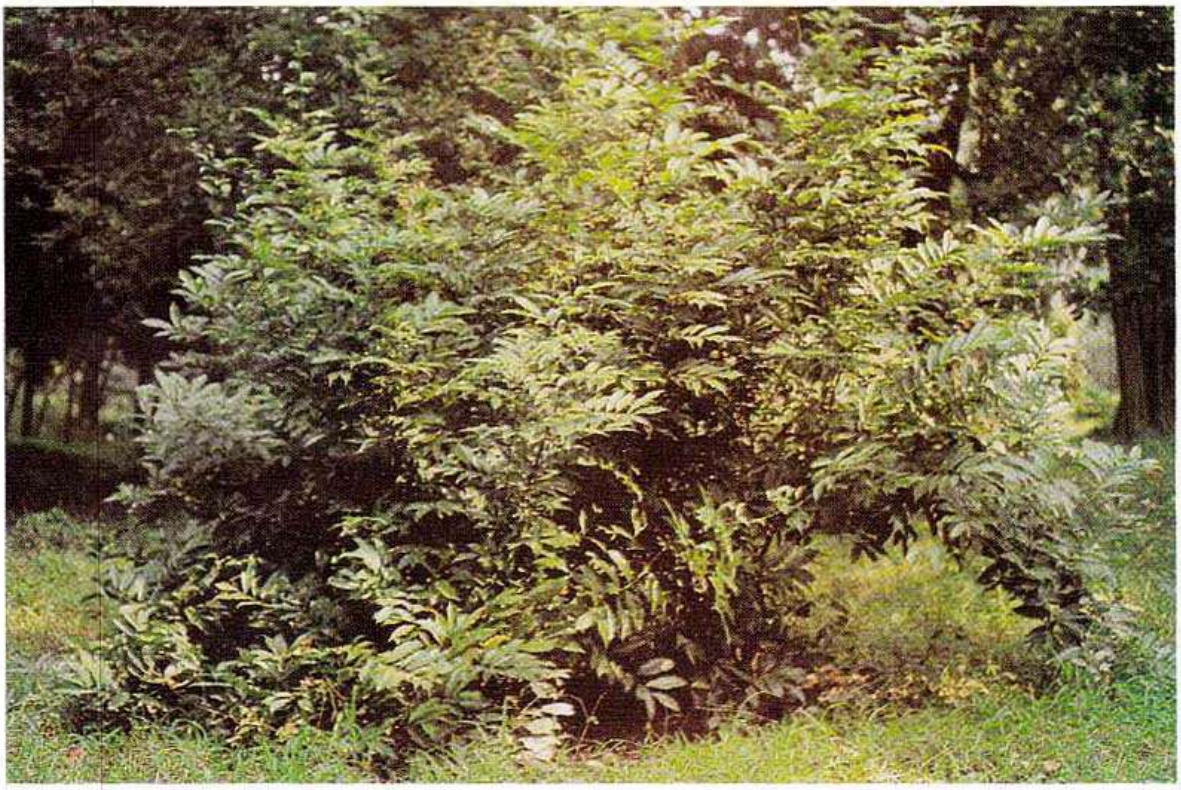
Japanese Lantern Hibiscus in flowers

Changeable Rose-a flower

Yellow Mallow tree with flowers

A variety of Rose Sharon "Jeanne d' Arc"

Hera Champa - Habit



Hera Champa - Flower

Hera Champa in fruits

Chinese Ixora in flowers

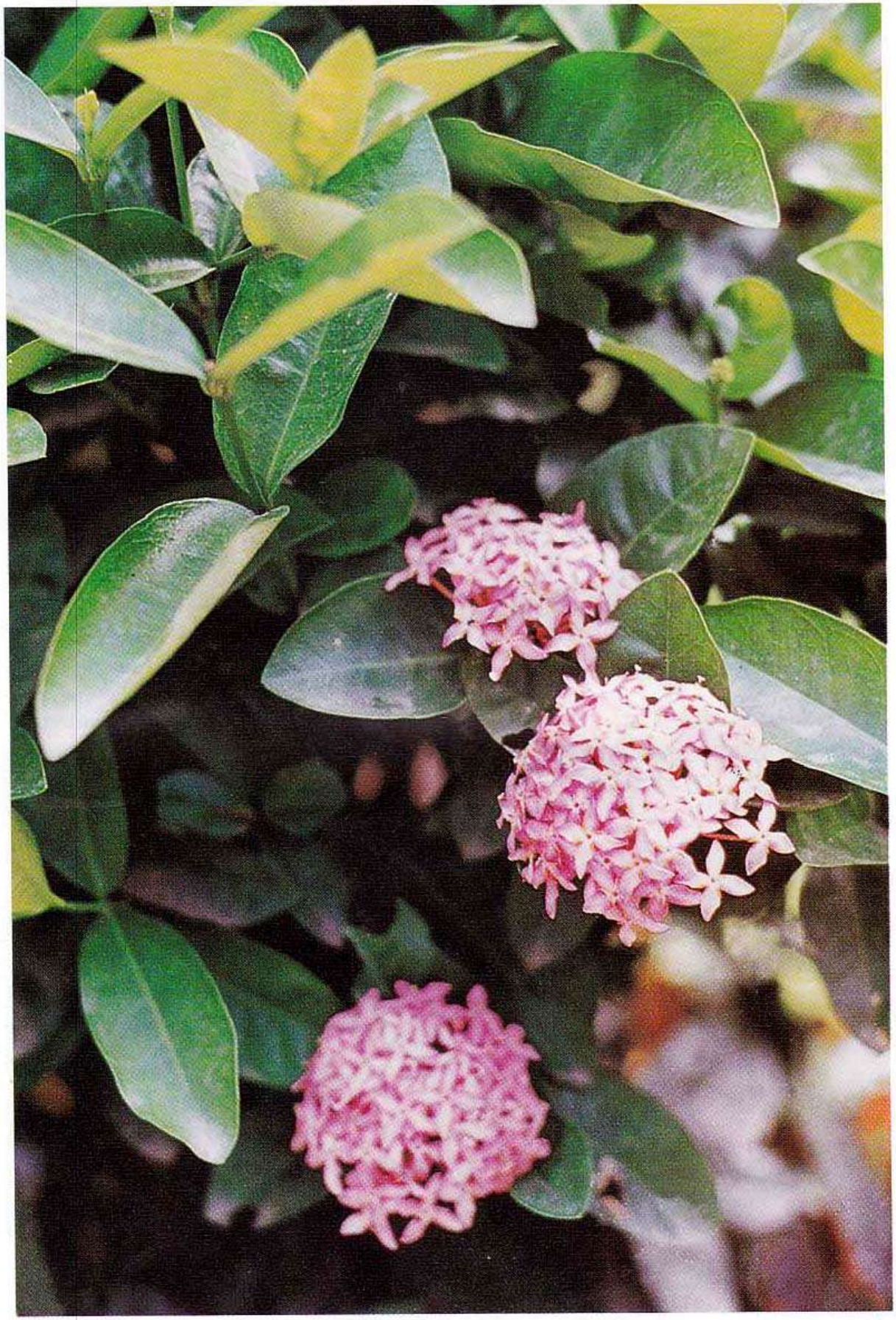
Chinese Ixora - hedges of various colours

Scarlet Ixora - habit and flowers

Yellow Ixora in bloom

Torch wood Ixora in bloom

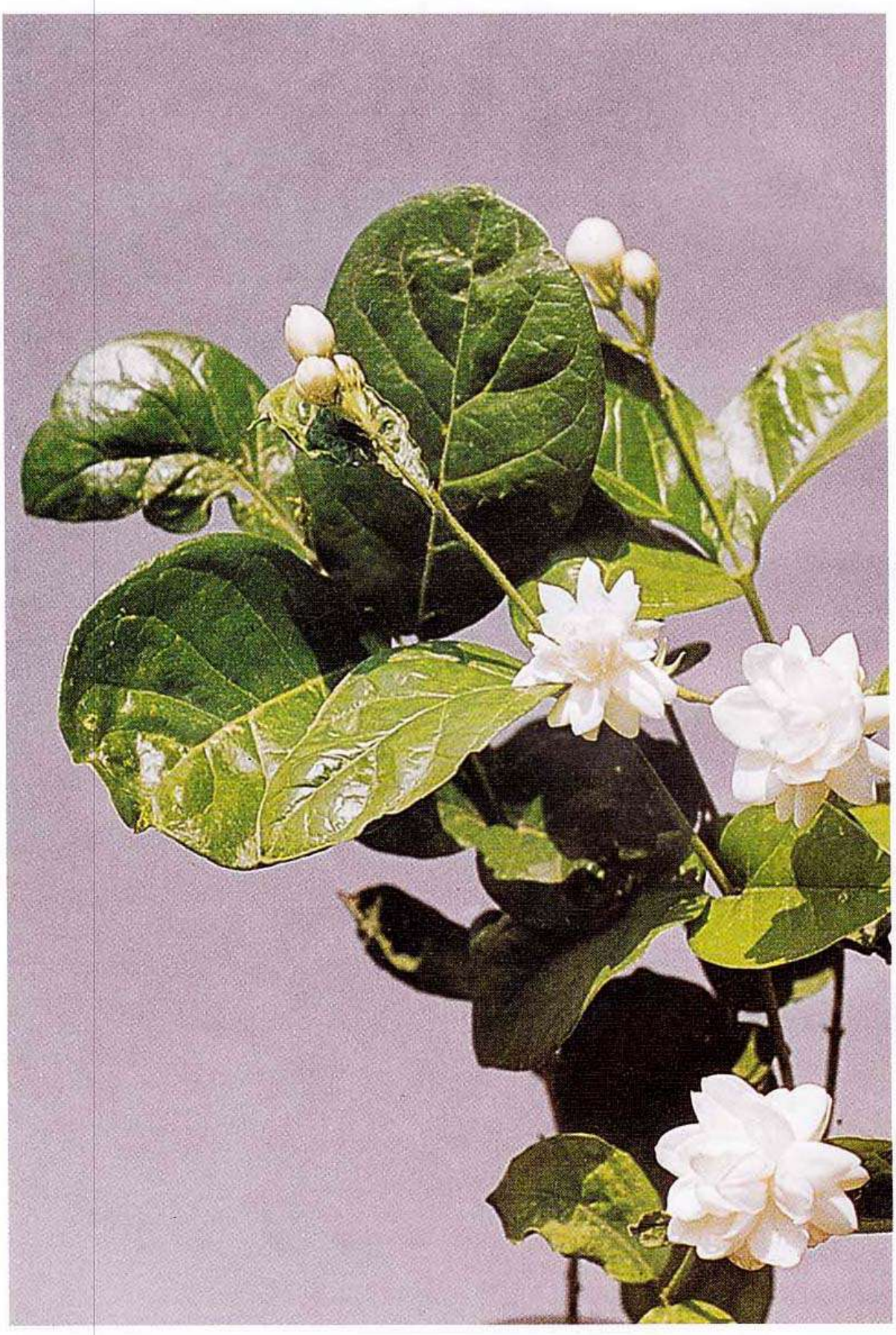
Singapore Ixora in flowers



Pink Ixora in bloom

Jasminum Multiflorum in flowers

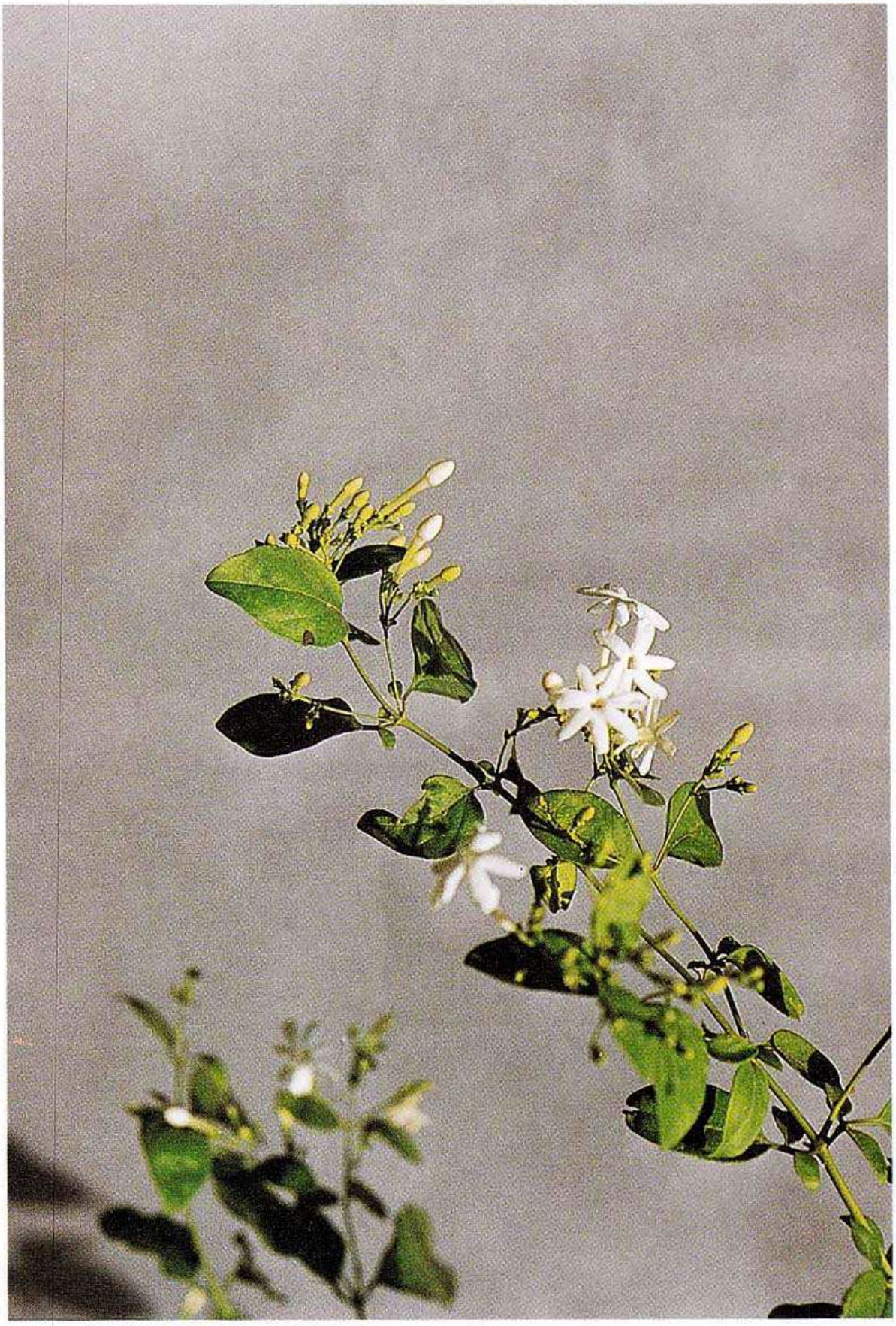
Jasminum Multiflorum - Rubiscens' in full bloom



Jasminum sambac 'Rai' in flowers

Jasminum sambac 'Motia' in flowers

Jasminum flexile in flowers



Jasmium auriculatum in flowers

Jasminum nitidum in flowers

Jasminum humile – habit and in bloom

Jasminum azoricum in flowers

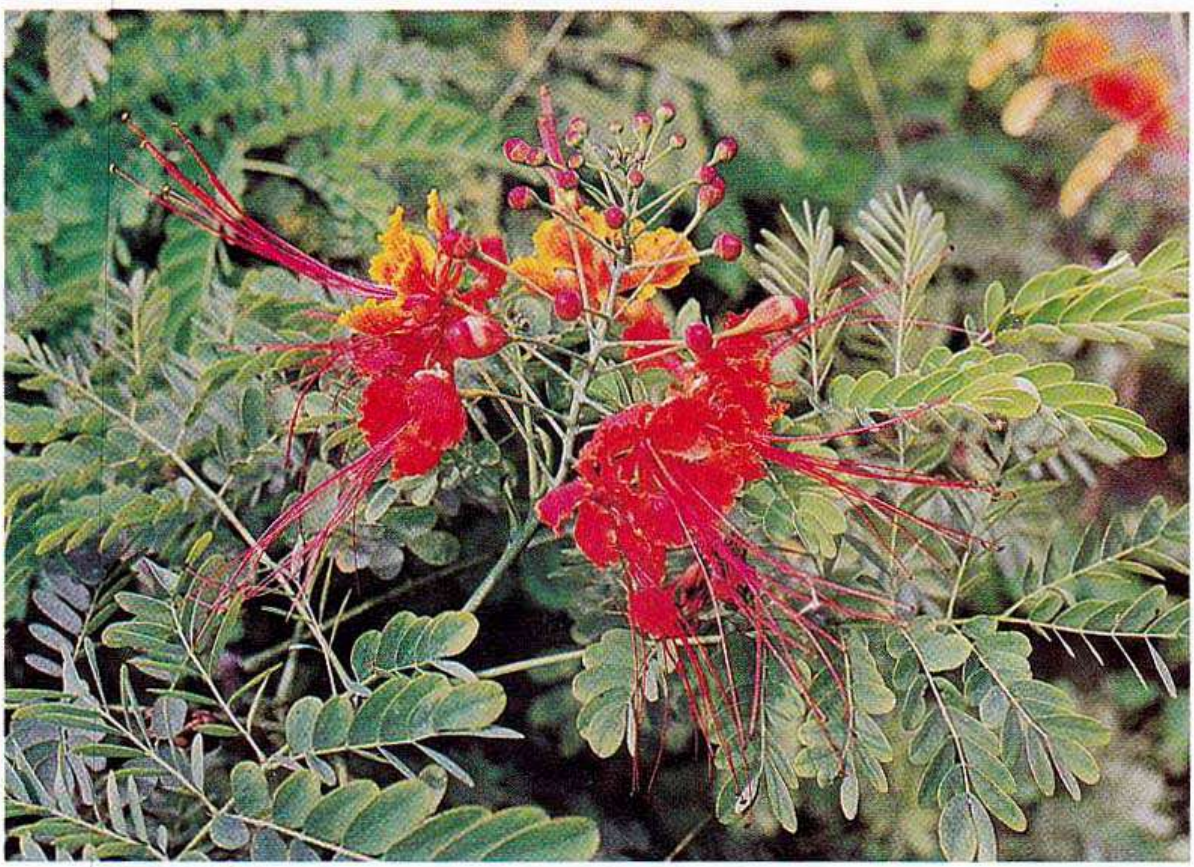
Madagascar Periwinkle in flowers

Madagascar Periwinkle 'alba' in flowers

Madagascar Periwinkle 'variegata' in flowers

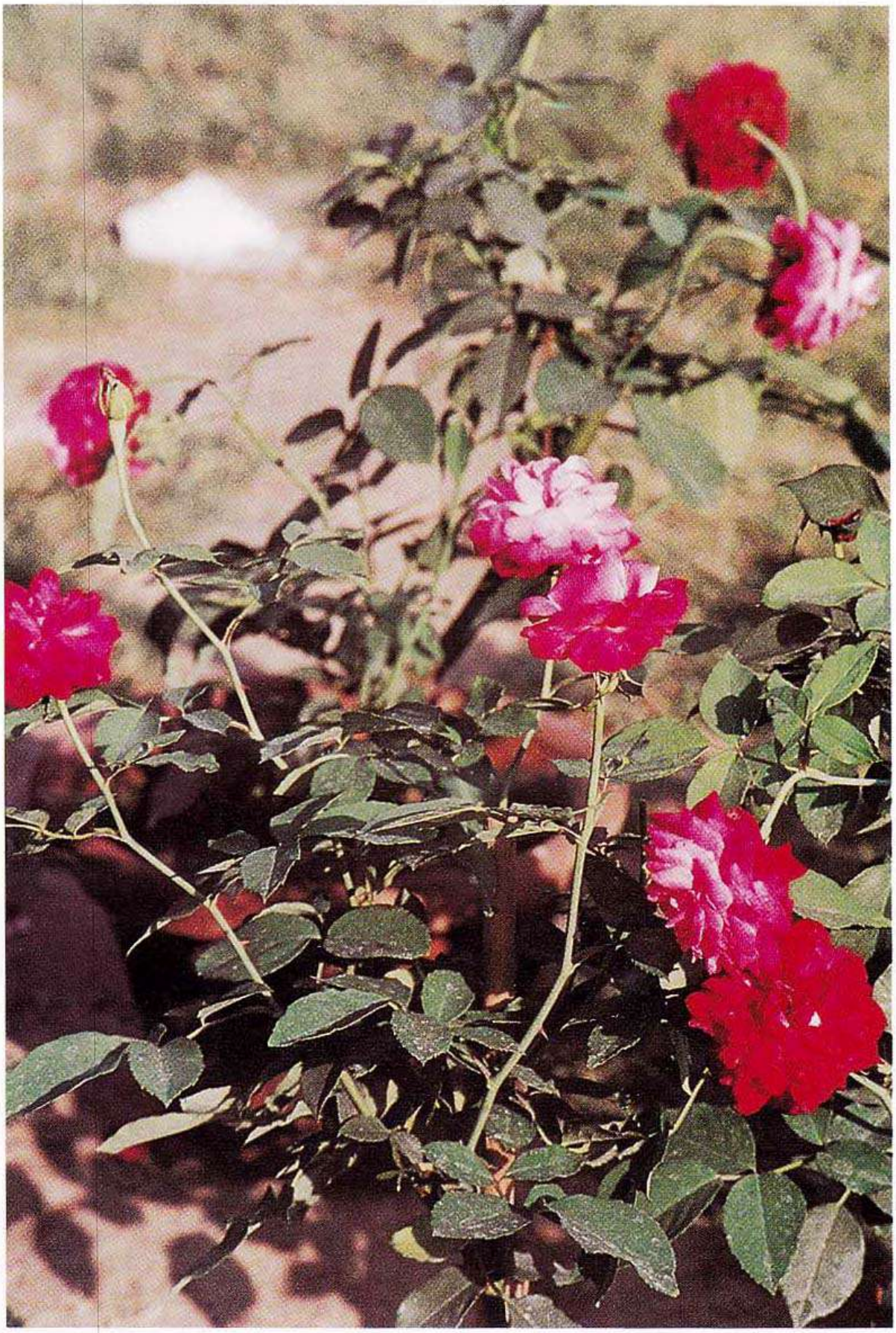
Radha Chura - habit and in flowers

Parijat in flowers



Radha Chura in flowers

Radha Chura ' Flava ' in flowers



Common English Dog Rose in flowers

Hybrid Tea rose - 'Chitra Ranjan'

Floribunds rose - 'Tata Centre'

Miniature rose - ' Pisky'

White Bauhinia in flowers

Hybrid Tea rose
in full bloom

Polyantha rose -
' Play Girl'

Variegated Bauhinia - showing habit, flowers and fruits

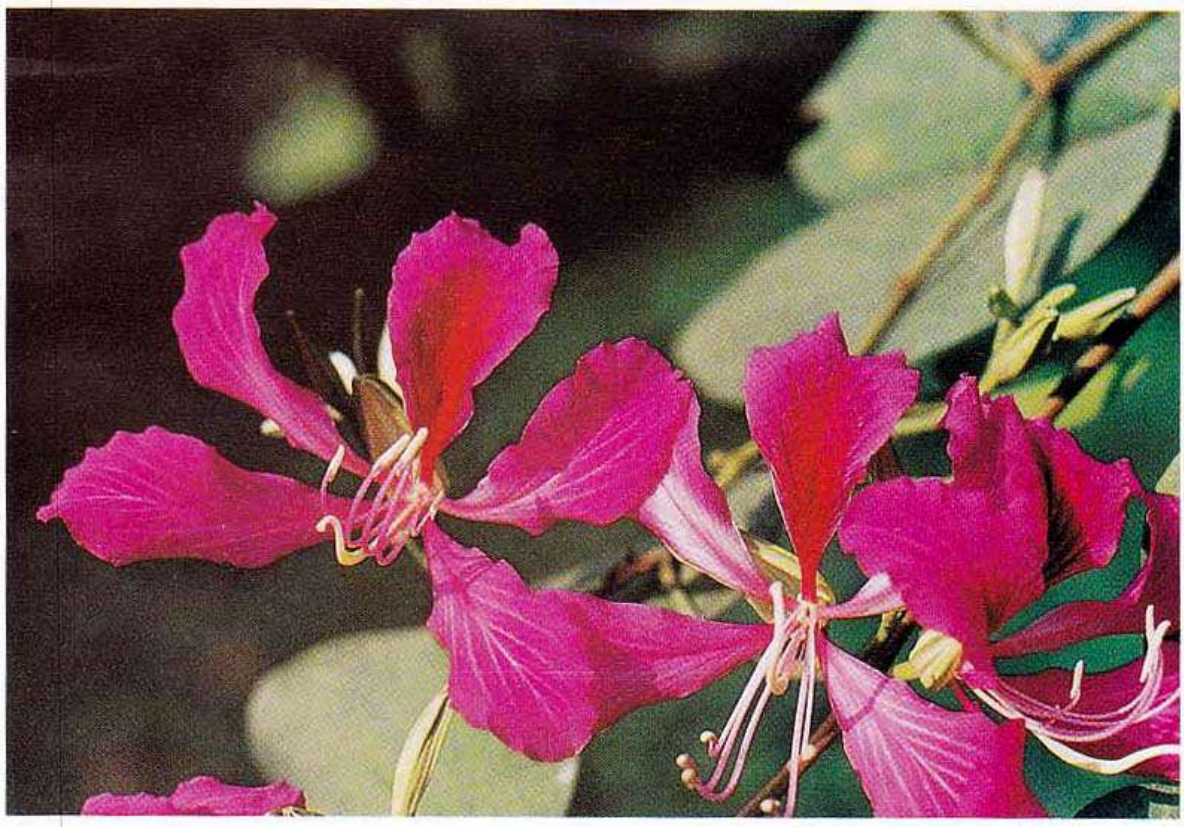
Purple Bauhinia in flowers

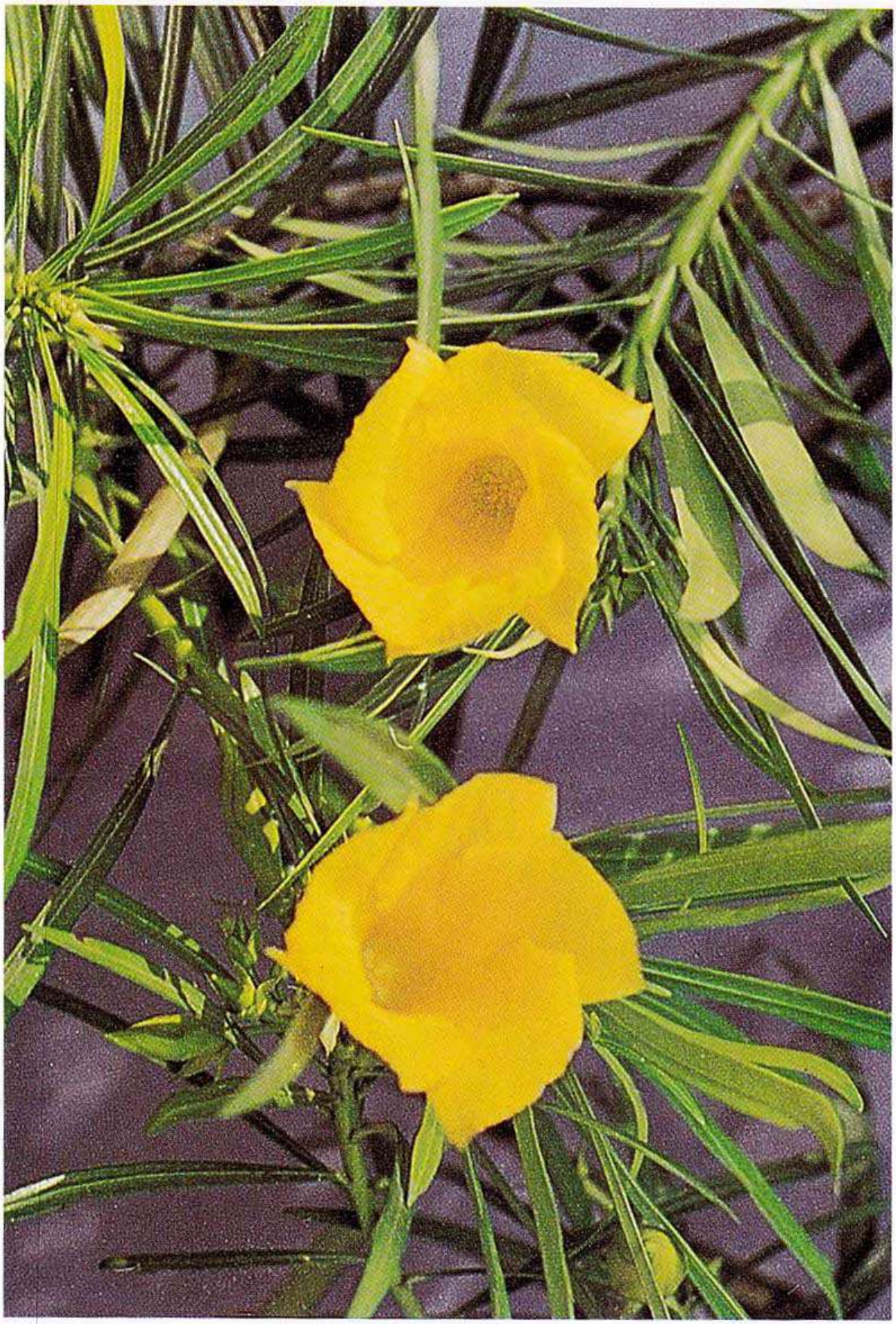
Variegated Bauhinia in flowers

Bell Bauhinia - showing habit and flowers

Bell Bauhinia - flowers

Hongkong Orchid tree in flowers

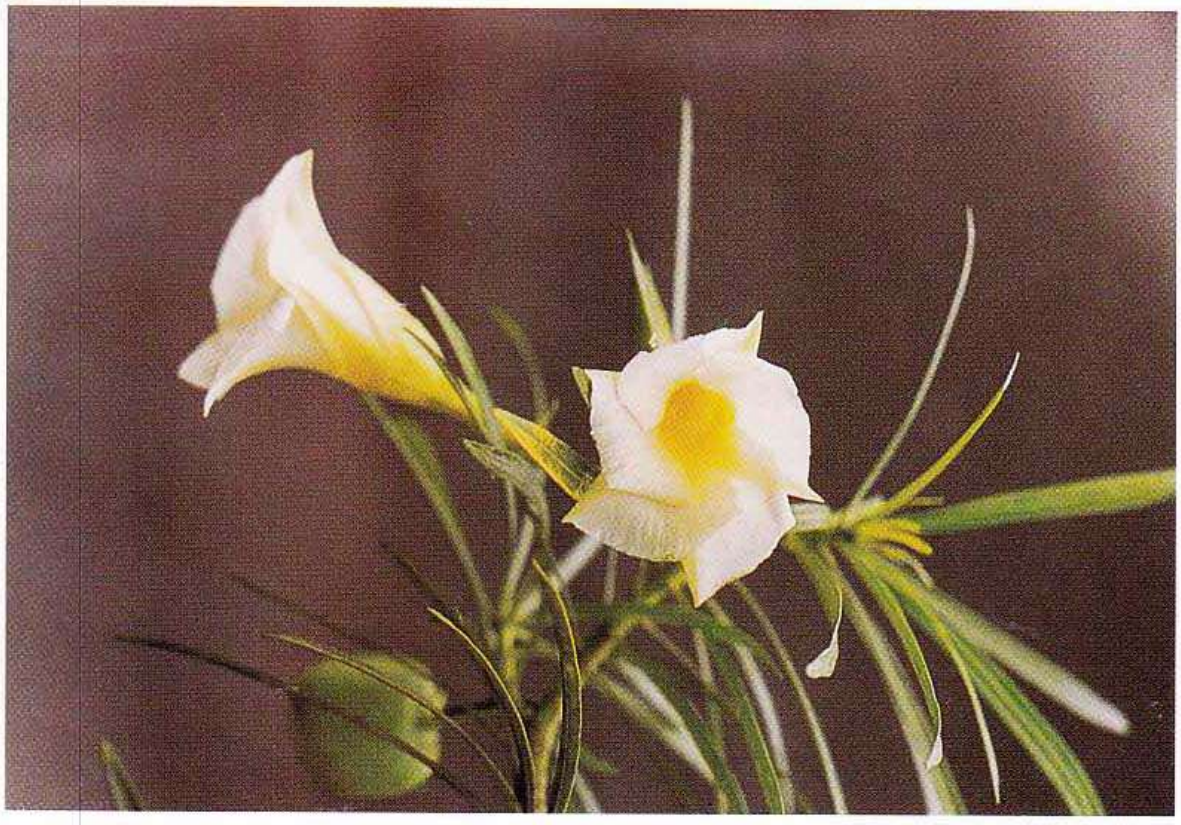




Yellow Oleander in flowers and fruits

Yellow Oleander of pink variety- flowers and fruits

Yellow Oleander - white flowers with yellow centre



Yellow Oleander showing habit, flowers and fruits

Yellow Oleander of pink variety - habit, flowers and fruits

Yellow Oleander

Popularly called Trumpet Flower, Bastard Oleander, Luckynut tree, Lucky Bean and Exile oil tree, Ashuaghna, Divyapushpa and Haripriya in Sanskrit, Kaner, Pila Kaneer, Kanail, Zord Kaner (Hindi), Kolkaphul, Haldi Karabi (Bengali), Konyar phul (Oriya), Pila Kaner (Gujarati), Pilvakkanhera (Marathi), Pachaganneru (Telugu), Pachaiyalori (Tamil), Kadukasi (Kannada) and Monja areli in Malayalam.

Scientific name is *Thevetia peruviana* (Pers.) K. Schum (or *T. neriifolia* Juss. ex Steud.), and belongs to family Apocynaceae. The name *Thevetia* is in the honour of French monk, Andre Thevet (1502-1592) who travelled in Brazil, *Peruviana* named after its native home Peru (Tropical America) and *neriifolia* is on its linear leaves.

Shrubs—or small trees, about 2-5 m tall, evergreen; woody stems—grey-brown shining bark, many cane like cylindrical branches and entire plant with milky white latex. Leaves—smooth, glossy green, linear, closely crowded on top of twigs. Flowers—fragrant, yellow, white or pink, bell-shaped with cylindrical tube and 5–hairy scales at throat. Fruit—a drupe, usually four angled and contains 2-4 hard seeds.

Flowers and fruits throughout the year and propagated through seeds.

A hardy but quick growing tree, it is suited to grow in any soil and climate but prefers full sun and semi-shade for good flowers and can be grown with little care.

It is generally planted near village temples for its flowers, which are offered to Lord Shiva and in gardens/parks for handsome foliage and showy flowers.

All parts including its milk are poisonous. Seeds are used as purgative, in rheumatic pain, etc. Its present valid botanical name is *Cascabela thevetia* (L.) Liippold.

WATER PLANTS

Indian Lotus

Lotus is the National Flower of India, commonly called the Sacred Lotus or Chinese Water Lily or Water Bean or East Indian Lotus; Indian neams are Ambuj, Padma, Pankaja and Kamala (Sanskrit), Kamal, Kanwal (Hindi), Padma (Bengali), Padum (Oriya and Assamese), Kanwal, Pamposh (Punjabi), Suriya kamal (Gujarati), Kamal (Marathi), Kalung (Telugu), Aambal, Thamarai (Tamil), Kamala (Kannada), Thamara and Senthamara (Malayalam).

Scientific name is *Nelumbo nucifera* Gaertn, belongs to water-lily family – Nelumbonaceae (or Nymphaeaceae). *Nelumbo* is derived from the word Nelum–b, a Sri Lankan name and *nucifera* in Latin means–nut bearing.

Lotus, a native of India, China and Japan is widely distributed throughout India, ascending up to 1800 m, found in the fresh water and wetlands of all the states and mostly also cultivated in water tanks, ponds, *jheels* in every part of India for its large red or white, single or double tulip like beautiful and fragrant flowers, and also for most parts of the plant being useful to mankind.

As per Hindu mythological belief, BRAHMA, the creator of the universe, was born on lotus flower, which emerged from navel-string of VISHNU the preserver, and always kept by Goddess LAKSHMI in her hand and likened by Goddess KALI and other deities and considered sacred and religious. Flowers are offered for religious worship and used in social functions, in some communities it is considered customary to use the flowers for paying regards.

Herbs—perennial, rhizomatous; leaves—large, flat and float on water; new leaves, orbicular or suborbicular 20-50 cm across, glabrous, shining, smooth, green above, paler beneath, petiole up to 2 m long with hard, minute papillae. Flowers—solitary, rose-pink or pure-white, fragrant, 7-25 cm across, peduncle up to 2 m long; sepals green or pink with yellow stamens. Fruit—torus large, top-shaped, 5-10 cm in diameter, spongy with 10-30 uniovolate carpels, sunk separately in cavities on the upper side; carpels—in the ovoid nut-like seeds (achenes).

Flowers during March to December, but stray flowers are seen almost throughout the year. Fruits during September to March.

Lotus is generally propagated through rhizomes by cutting mature ones into small pieces with 2-3 eyes and laid in the fresh water pond in the month of March and April and allowed enough water for 6-7 months. Pot planting is not advisable due to rapid growth and spread of rhizomes, thus planting in pond and tank is preferred, however, plants do not flourish well in lilypools.

Seeds are sown by making a ball of clay, keeping seeds therein and throwing them into ponds, having enough mud, sufficient organic matter and water. It is said that seeds retain the viability for longer periods (about 120 years) as found in Manchuria, where seeds were found buried in the soil. About 10-12 kg seeds are required for one ha pond.

Plants are suited to grow and flowers well in fresh water ponds, having soils rich in organic matter.

Besides its religious and social value, almost all plant parts are considered to be of economic and medicinal importance. Rhizomes, young leaves, petioles and flowers are used as vegetable; the fruiting–torus–'kamal gatta', is nutritious and edible after removing the outer black testa (skin), which is poisonous; leaf-stalks yield fibre and leaves are used as dining plates. Arrowroot from fresh rhizomes are sweet and nutritious, given to children as tonic, to cure diarrhoea, dysentery and dyspesia. Fruits are given to control vomiting. The milky juice of leaf and floral-stalk is given to cure diarrhoea.

Leaf-blades of young plants float on water-surface whereas older plants remain out of water with their large petiole. Generally, unopened flowers, likely to open within 2-3 days are harvested for commercial floral need. In general practice, no manure is given, however, the organic matter self-deposited by plant parts are sufficient for its growth and flowering.

Water Lily

It is mostly found in fresh water ponds, lakes, jheels and in muddy places, botanically called *Nymphaea* in Latin meaning the water-nymph or water lily, whereas in Greek it is derived from 'nymphaia' meaning goddess of springs, belonging to water family-Nymphaeaceae; usually perennial herbs—with horizontal or erect or creeping rootstocks (stolons). Leaves—orbicular, floating on long petioles; and much branched. Flowers—on long peduncles, floating or emerged, showy; sepals 4; petals—numerous, white, pink, deep red or with many attractive colours, crowned by many radiating stamens—and fruits—spongy berries, covered with aril.

Out of six species occurring in India, *Nymphaea rubra* Roxb. *N. pubescens* Willd. and *N. nouchali* Burm. f. are most common, found wild or cultivated in ponds and lakes, for varied sizes and attractive colours.

Nymphaea rubra Roxb., commonly called Indian Red Water Lily; locally known as Kanwal (Hindi), Lal Shapla (Bengali) and Rang-kai in Oriya. It is a native of India (Bengal) and found throughout in different parts, particularly in plains, only in permanent ponds and lakes.

It is characterised with broad, ovate, elliptic or kidney-shaped leaves, first dark red on both sides, turn green on upper side, 30-50 cm in diameter. Flowers—5-15 cm across, deep carmine red or crimson-red; filaments—red, about two-third stamens with a dark purplish band near base; it never sets fruits.

Flowers throughout the year and profuse during August-January, it blooms in the night and flower remains open till nearly noon and is beautiful to look at. Propagated through stolons and vegetative buds.

Variety *Rubra "rosea"*; leaves—spotted brown and toothed at margins; flowers—large rosy–carmine; stamens—yellow with reddish brown tips and without any purplish band on their filaments is also met in cultivation.

Nymphaea pubescens Willd., is a native to India and distributed throughout the plains, locally called Kumud (Sanskrit), Koka, Kanwal (Hindi), Shaluk, Shapla (Bengali), Dhobala-kain (Oriya), Mokuwa (Assamese), Ambal (Malayalam), Allitamarai and Vellambal in Tamil. Its leaves—are characteristically broad-ovate-elliptic to orbicular, dark green, glabrous above, green or dull-purplish-green, pubescent beneath. Flowers—white and slightly fragrant; sepals—outside green with 5-9 prominent white veins, white inside; stamens—yellow, and fruits are berry.

Flowers throughout the year, abundantly during August-January and propagated through stolons and seeds.

Nymphaea nouchali Burm. f. (or *N. stellata* Willd.), is locally called Bhenght (Hindi), Sundi, Nila-sapla (Bengali), Sitambal (Malayalam), Subdi-kain (Oriya) and Nilotpalam in Tamil; an indigenous plant found throughout the plains having bluish-purple, or pale-bluish, fragrant flowers; sepals—triangular-ovate, green often with dark purplish streaks outside. Petals—8-15; stamens—outer ones sterile, yellow with bluish appendages. Fruit—a berry.

Flowers during August-January and propagated through rhizomes and seeds.

Almost all parts are eaten as vegetable either raw or cooked and rhizomes used in dysentery and dyspepsia.

Besides, a few exotics and horticultural hybrids are also grown in garden ponds and *jheels* for their attractive flowers.

Indian Lotus - rose-pink flower

Indian Lotus - white flower

Indian Lotus - white variety in cultivation

Water Lily (*Nymphaea rubra)* in bloom

Water Lily (*Nymphaea pubescens)* in flowers

References

Ambasta, S.P. *et. al.* (eds.). *The useful plants of India.* CSIR, New Delhi, 1986.

Anonymous. *Chrysanthemum,* Bulletin No. 1, National Botanical Garden, Lucknow. 1956.

Anonymous. *Wealth of India, A Dictionary of Indian raw materials and industrial products.* 11 vols. CSIR, New Delhi. 1948-1976.

Anonymous. *Sutton seeds bulletin – New flowers and vegetables,* Jarrold & Sons Ltd., Norwish, London. 1976.

Bailey, L.H. *The Standard Cyclopaedia of Horticulture.* (Enlarged edn.) (vol. I to III). The MacMillan Company, New York. vols.I & II 1928 & vol. III 1929).

Bailey, L.H. *Manual of cultivated plants.* (revised edn.) The MacMillan Company, New York. 1949.

Benthall, A.P. *Trees of Calcutta and its neighbourhood.* Thacker Spink & Company Ltd., Calcutta.1946.

Blatter, E. & W.S. Millard. *Some Beautiful Indian Trees.* (second & revised edn.) Bombay Nat. Hist. Soc., Bombay. 1954.

Bor, N.L. & M.B. Raizada, *Some beautiful Indian climbers and shrubs.* Bombay Nat. Hist. Soc. Bombay. 1954.

Bose, T.K. & B. Chowdhury (eds.) *Tropical Garden Plants in colour.* Horticultural and Allied Publisher, Calcutta. 1991.

Bose, T.K. & L.P. Yadav. (eds.) *Commercial Flowers.* Naya Prokash, Calcutta. 1989.

Bruggeman, L. *Tropical Plants and their cultivation.* Thames and Hudson, London. 1957.

Chakraverty, R.K. & S.K. Jain. Beautiful Trees and Shrubs of Calcutta. BSI, Howrah. 1984.

Chakraverty, R.K., D.S. Pandey & D.P. Mukhopadhya. *Directory of plants in the Botanic Gardens of India.* (in press).

Debnath, H.S. & M.P. Nayar. Papaveraceae, in *Flora of India,* vol.II: 1, 33, BSI, Calcutta, 1993.

Desai, B.L. *Seasonal Flowers.* ICAR, New Delhi. 1962.

Desai, B.L. *Planning & Planting Designs of home gardens.* ICAR, New Delhi. 1979.

Firminger, T.A. *Manual of Gardening for India.* Thacker Spink & Co., Calcutta. 1957.

Gopalswamienger, K.S. *Complete gardening in India.* The Hosali Press, Bangalore. 1951.

Graf, A.B. *Tropica,* Roehrs Company, New Jersey.1981.

Graf, A.B. *Exotica 3-Pictorial Cyclopedia of indoor plants.* Roehrs Company, New Jersey. 1970.

Harler, A.W. (The) *Garden in the plains.* (3rd edn.) Oxford University Press, London. 1948.

Hellyer, A.G. L. The *Amateur Gardener* W.H. & L. Collingridge Ltd., London. 1946.

Hooker, J.D. (ed.) *The Flora of British India.* 1-7 vols. L. Reeve & Co., London. 1872-1897, (reprinted edn. 1978).

Mitra R.L. Nympheaceae, in *Flora of India* vol.1: 426-435. BSI. Calcutta. 1993.

Mitra R.L. Nelumbonaceae, in *Flora of India.* vol.1: 441-442. BSI, Calcutta. 1993.

Pal, B.P. *Beautiful Climbers of India.* ICAR, New Delhi. 1960.

Pal, B.P. *The Rose in India.* ICAR, New Delhi. 1966. (revised edn. 1972).

Pandey, D.S. Exotics-Introduced and natural immigrants, weeds, cultivated, etc. in *Flora of India*-Introductory volume, Part-II. 266-301. BSI, Calcutta. 2000.

Percy, Lancaster, S. *Gardening in India (An amateur in Indian Gardens).* Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi (revised edn.) 1977.

Percy, Thrower. *Garden Book*. The Hamylon Publishing Group Ltd., London. 1979.

Pradhan, C. Udai & C. Satyam Pradhan. *100 beautiful Himalayan Orchids and how to grow them*. Darjeeling Gorakha Hill Council, W.B. 1997.

Quattrocchi, Umberto. *CRC World Dictionary of Plant names*. I-IV vols. CRC Press. Boca Raton, London. 2000.

Sharma, B.D. & D.S. Pandey, *Exotic Flora of Allahabad District*. BSI, Howrah. 1984.

Singh, N.P. & D.S. Pandey, *Tetramerous flowers in Artabotrys hexapetalous* (L.) Bhandari, *Mah. Vid. Mand. Patrika*, 2(1): 50-51. 1969.

Glossary

Achene – a dry, one seeded fruit.
Acuminate – ending in a tapering apex.
Abrupt – changing suddenly rather than gradually.
Albumen – a thick starchy substance surrounding the embryo.
Alternate – any arrangement of leaves or other parts not opposite or whorled; placed singly at different heights on the axis or stem.
Annual – of one season's duration from seed to maturity and death.
or A plant which completes its life cycle, including flowering and fruiting within one year.
Anther – the pollen-bearing part of the stamen.
Antidote – a medicine that counteracts poison.
Antiseptic – preventing decay or growth of bacteria.
Appendage – an attached subsidiary or secondary part, as a projecting part.
Arbours – erected on iron or wood roof covered with climbers, sides are usually open.
Arch – a curved structure, covered with climbers.
Arches – are supports provided for handsome climbers to display themselves, usually made over walks with angle iron supports.
Avenue – a road or walk sides, planted with trees.
Axillary – in an axil.
Berry – a fleshy indehiscent fruit with many seeds having no true stone.
Biennial – of two season's duration from seed to maturity and death.
Bract – a much-reduced leaf near flowers.
Bracteole – small bracts occurring on the axis than that on which the bract is situated.
Bracteate – having small bracts.
Bronchitis – inflammation of lungs or slight pneumonia.
Budding – a mode of propagation in which a bud from one plant (Scion) is inserted under the young bark of another (Stock).
Bulb – a thickened part made up of scales or plates on a much-shortened axis.
Bulbous plants – bearing bulbs, tubers, corms, rhizomes, etc. or with underground modified stem, containing a store of food and energy for the development of shoot and flowers in successive years.
Button holes – flowers used for decorating coat's collar.
Butteress – plant-like structure radiating from the base of the stem to provide extra support.
Calyx – the outer circle of floral envelope, comprised of more than two sepals.
Canopy – a covering spread of plant.
Capsule – a form of fruit which becomes dry when ripe and opens by two or more valves.
Campanulate – bell-shaped.
Cardio-tonic – medicine that stimulates the heart.
Carminative – throwing out flatulence or the medicine that eases flatulence.
Carpel – One of the foliar units of a compound pistil or ovary, a simple pistil has one carpel.
Catharticus – free flow of urination.
Climber – plants having special structure (tendrils, modified leaf stalks, rootlets or hook-like thorns, etc.) to climb on supports.

Cluster – in a bunch.
Conical – cone-shaped.
Copious – profuse.
Cordate – shaped like the conventional heart (as on playing cards), or with the base heart-shaped.
Corolla – a collective name for the petals.
Coriaceous – of a leathery texture.
Corymb – a form of floral arrangement (inflorescense) in which the several branches or flower-stalks arising at different levels reach more or less the same level at the top.
Cuttings – are mode of propagation in which any plant parts (particularly stems) are detached from the mother plant and planted to have new plants.
Crested – with elevated and irregular or toothed ridge.
Corm – a solid bulb-like part, usually subterranean.
Creeper – a trailing shoot that takes root mostly throughout its length.
Crenate – with margin notched with regular rounded teeth.
Cultivar – a variety or race that has originated and persisted under cultivation.
Cylindrical – having the form of a roller.
Cyme – a system of branching in which the main axis grows or terminates in a flower; the secondary or lateral axes from beneath the apex continue; to grow beyond the parent axis.
Cymose – having flowers in cymes.
Deciduous – falling of leaves at certain season and producing leaves during each year.
Digitate – spreading like the fingers of the hand.
Disc – a swelling of the torus inside the calyx and under or outside the pistil, sometimes glandular.
Dome – a rounded form.
Dormant – resting; not in active growth.
Dorsal – situated at the back of.
Dorsifixed – fixed by the back of, in contrast to the state of being attached by the end or margin, etc.
Dyspepsia – related to indigestion.
Edging – dividing of roads, walks, paths, demarcation of space alloted for particular purpose.
Elliptic – a flat part that is oval and narrowed to rounded ends and widest at or about the middle.
Elongate – in length, stretched out.
Ensiform – sword-shaped.
Entire – margin or edges continuous, not in any way toothed or cut.
Evergreen – remaining green throughout the year.
Exotic – native of foreign origin, or not indigenous to India.
Ex-situ – a place where plant is grown, other than its original habitats or site.
Fasciated – much flattened.
Fertilization – the action of pollen upon the pistil through the stigma.
Filament – the stalk of an anther.
Filiform – very slender, similar to thread.
Fluted – a hollow and round, pertaining to a musical instrument.
Follicle – a pod-like structure containing seeds.
Fruit – the ripend ovary with the adnate parts, the seed-bearing organ.
Genus – a group of closely allied species.
Germination – the awakening of the organs of life and the beginning of growth in the seed.
Glabrous – without any hairs.
Grafting – the act of placing a portion of one plant (bud or scion) into or on a stem, root or branch of mother (stock) in a such a way that a union will be formed and the partners will continue to grow. This term includes budding (bud grafting) and grafting proper.

Habitat – the place where an organism lives.
Hedge – strip of plants, planted closely to serve as a fence or barrier.
Herb – plant naturally lying up to the ground; lacking definite woody firm structure.
Herbaceous garden – a section of a garden devoted to herbaceous-perennial plants, planted in a systematic order.
Hispid – having stiff or bristly hairs.
Herbaceous – not woody, soft.
Humus – decomposed organic matter.
Hybrid – a plant resulting from a cross between two or more parents.
Hyper-tension – over strain.
Imparipinnate – odd-pinnate; with a single terminal leaflet.
Indehiscent – not regularly opening, as a seed pod or anther.
Inflorescence – mode of flower-bearing or flower cluster on an axis.
Indigenous – native to a country.
Insecticide – materials which kill insects.
In-situ – a place where a plant is intended to remain after germinating.
Involucre – bracts are arranged in one or more whorls around the base of the flower or inflorescence.
Lanceolate – shaped like a lance-head.
Laxative – tending to loosen the bowels.
Layerings – the rooting by artificial means, of a branch while still attached to the parent plant.
Leaflet – one part of a compound leaf.
Limb – the expanded part of a corolla, petals.
Linear – long and narrow.
Lobed – cut less than half way down into more or less rounded segments.
Malignant – tending to cause death or to go from bad to worse, may be fatal to life.
Manure – substances which are added to the soil for encouraging and sustaining plant growth.
Moniliform – appearing bead-like.
Moon light garden – planted with trees, shrubs, climbers and annuals having white flowers.
Nursery – is a place for the raising or handling of young plants until they are ready for more permanent planting.
Oblong – longer than broad and with the sides more or less parallel most of their length.
Oblanceolate – inversely lanceolate.
Orbicular – circular or disc-shaped.
Opposite – on opposing sides of an axis.
Oval – egg-shaped.
Ovary – ovule-bearing part of a pistil.
Ovate – egg-shaped in outline.
Ovate-lanceolate – between ovate and lanceolate.
Ovate-oblong – between ovate and oblong.
Palmate – lobed or divided in a palm or hand-like fingers.
Panicle – a repeatedly branched inflorescence.
Papillae – minute pimple-like structures.
Pappus – peculiar modified calyx-limb, borne on the ovary; bristle-like, scales.
Paripinnate – pinnate, with an even number of leaflets.
Pedicel – stem of one flower.
Peduncle – the stalk or stem of an inflorescence.
Pendant – hanging.
Perennial – grow for three or more seasons.
Pergola – a garden walk having plants on either side.

Pergolas – are series of connected arches, having good length and planted over by good climbers.
Persistent – remaining attached.
Petal – one of the divisions of the corolla.
Petaloid – petal-like color and shape.
Petiole – leaf-stalk.
Pillars – climbers are planted and trained over wooden pillars, particularly at the junctions of walks in the corners.
Pinnae – (singular *pinna*) – a primary division or leaflet of a pinnate leaf.
Pinnate – a compound leaf with two or more leaflets emerging from each side of the axis or rachis.
Pistil – the unit of the gynoecium, comprised of ovary, style and stigma.
Pistillate – having pistils.
Pod – a typical dry fruit, elongated in shape and dehisching along one or both sutures.
Pollination – the process by which the pollen are carried by an insect, wind or any other agency from stamen and deposited on the stigma.
Prune – to trim off superfluous or undesired plant parts.
Pruning – is the method of removal of any part of the plant, in order that the remaining part may conform more nearly to the pruner's desire.
Qubescent – covered with close, short fine hairs.
Quilled – large feathered.
Raceme – an inflorescence in which the main axis continues to grow and the lowest flowers are the oldest and open first.
Racemose – having flowers in racemes.
Ray – Outer modified florets of some composites/Asteraceous flowers with an extended or strap-like part of the coroll.
Reticulate – the network of veins in a leaf.
Rheumatic – a disease causing pain and swollen joints.
Rhizome – underground stem; distinguished from a root by presence of nodes, buds or scale-like leaves.
Rootstock – the root bearing plant or portion in which the scion is inserted.
Rugose – with numerous minute elevations and depressions - wrinkled.
Scabrous – rough on touch.
Scandent – climbing without aid of tendrils.
Sedative – a soothing medicine (tranquilizer).
Seed – the ripened ovule.
Seedling – a young plant raised from seed.
Segment – section or one of the parts of a leaf, petal, calyx or perianth.
Sepal – one of the divisions of the calyx.
Serrate – saw-toothed margin with the teeth pointing forward.
Sessile – having no stalk.
Shrub – a perennial plant with many persistent woody stems arising from or near the base. If the woody part is confined to the lower portion of the plant while the upper plant is slender, then called sub-shrubs.
Shrubbery – the part of the garden devoted to shrubs or sub-shrubs.
Slender – long, thin and not stout.
Soil – the upper layer of the earth crust, upon which plants grow and depend for their nourishment.
Solitary – born singly or alone.
Spike – a form of racemose inflorescence in which the flowers are sessile on the axis.
Spikelet – a secondary spike (a part of spike).

Staminal-tube – a tube formed by stamens on androecium.
Stamen – the unit of androecium (male organ) comprised of anther and filament, sometimes reduced to only one anther, the pollen-bearing organ of a seed-plant.
Stem – the main axis of a plant; leaf-bearing and flower-bearing as distinguished from the root-bearing axis.
Stigma – the part of the pistil that receives the pollen.
Stipule – a basal appendage of a petiole, which springs from each side of the leaf-base.
Straggling – wandering.
Suberect – somewhat, slightly or rather erect.
Subglobose – somewhat slightly or rather globose.
Subsessile – somewhat slightly or rather sessile.
Sucker – a shoot arising below ground and a new shoot from an old stem.
Tannin – is a light yellow substance found in certain plants, particularly in galls, which are grown on plants caused by bacteria, fungi or insects, used for tanning and colouring of leather, etc.
Terete – circular in transverse section; imperfectly cylindrical because the object may taper.
Terminal – at the tip or distal end.
Terrace – a raised level space or platform supported by a retaining wall.
Tetramerous – in four whorls.
Tomentose – densely woolly or with matted, soft-wool-like hairiness.
Torus – receptacle.
Training – when a plant is dried, fastened, staked or supported over trellies or pergolas in certain fashion or some of its parts are pruned for giving the plant a framework.
Tree – a woody plant that produces one main trunk and a more or less distinct and elevated head.
Trellies – climbers planted on a framework.
Trifoliate – having a leaf or leaves of three leaflets.
Tuber – a thickened rhizome or stem, usually underground, bearing 'eyes' or 'buds'.
Tuberous – consisting of tubers.
Umbel – an inflorescence in which the branches all radiate from the top of the peduncle. If these branches each terminate in a flower, the umbel is simple; if they are again umbellately branched, the umbel is compound.
Undulate – wavy; up and down.
Variegata – to mark with different colours other than normal (green).
Variety – defined as a group of individual propagated asexually from a single parent and are true to the type. Horticultural variety is designated as clone due to their derivation from a single parent by vegetative means;
or
a sport or variation subordinate to a species.
Venation – arrangement of veins.
Versatile – said of an anther which is attached above its base to the attenuated tip of the filament on which it swings.
Water garden – cultivation of water loving plants.
Water plants – those growing in water, immersed wholly or in part.
Water sprout – occurs on the body or frame work of trees and which makes rank vigorous growth.
Weed – a plant in the wrong place.
Wetland – damp land.
Whorls – three or more leaves or flowers at one node, in a circle.
Wilting – hanging loosely without normal rigidity owing to insufficient water or to excessive watering.

This profusely illustrated book introduces about 150 common flowering plants in India. These plants are either found wild or are being cultivated for their ornamental flowers.They are further classified as Annuals, Trees, Shrubs, Climbers, Bulbous and Water plants for their easy identification. The text details of each plant include its common name, vernacular name, local as well as botanical name, family, distribution, brief description of its morphological characters, cultivation and utillity. The authors D.S. Pandey and N.P. Singh, associated with the Botanical Survey of India, are prolific writers on plant wealth of India and have several publications to their credit. Presented in a simple narrative form this book is helpful in generating awareness about the rich flora of India among common growers and plant lovers.

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